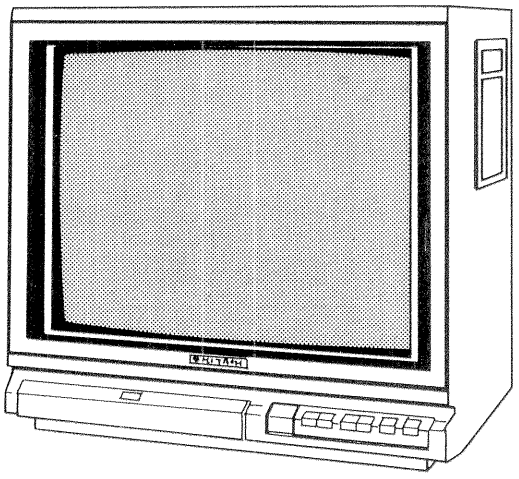
HITACHI
SERVICE MANUAL

YK | No.989E

CT3000M

CT3000S
CT3000W



This service manual shows only essential items.
Our complete service manual including "alignment procedure", and "technical information" are issued by manual No. 895.

CAUTION: Before servicing this chassis, it is important that the service technician read the "Safety Precaution" and "Product Safety Notices" in this Service Manual.

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SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

COLOR TELEVISION

July 1984 YOKOHAMA WORKS

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis or picture tube.

WARNING: Since the chassis of this receiver is connected to one side of AC power supply during operation, whenever the receiver is plugged in, service should not be attempted by anyone unfamiliar with the precautions necessary when working on this type of receiver.

The following precautions should be observed:

1. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep picture tube away from the body while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on a "HOT" chassis receiver.
3. When replacing a chassis in the receiver, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covershields, isolation resistor-capacitor, etc.
4. When service is required, observe the original lead dress. Extra precaution should be taken to assure correct lead dress in the high voltage circuitry area.
5. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacture's. Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into he receiver by the manufacturer has become defective, or inadvertently defeated during servicing.

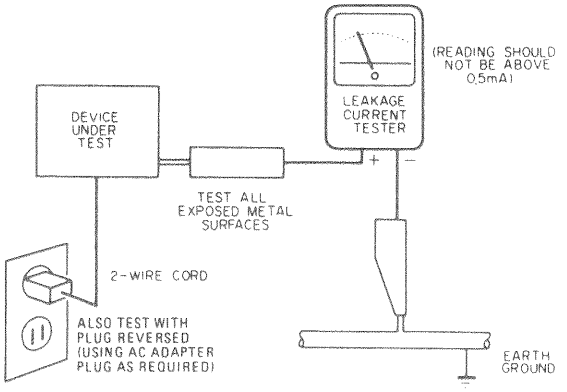
Therefore, the following checks should be performed for the continued protection of the customer and service technician.

Leakage Current Cold Check

With the AC plug removed from the 120V or 220V AC 50/60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC 500V), connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3MΩ and a maximum resistor reading of 5MΩ. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a 120V or 220V AC 50/60Hz outlet (do not use an isolation transformer for this check). Turn the AC power switch on. Using a "leakage Current Tester (Simpson Model 229 equvalent)", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly any exposed metal part having a return path to the chassis, to a known earth ground (water pipe, conduit, etc.). Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE RECEIVER TO THE CUSTOMER.

High Voltage

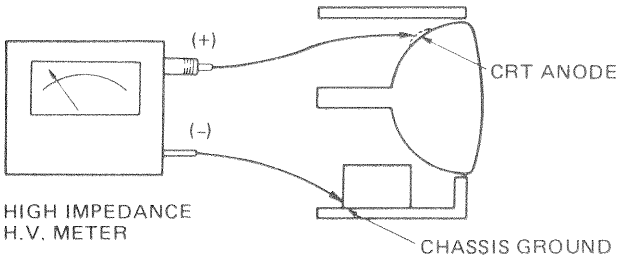
This receiver is provided with a hold down circuit for clearly indicating that voltage has increased in excess of a predetermined value. Comply with all notes described in this Service Manual regarding this hold down circuit when servicing, so that this hold down circuit may correctly be operated.

Serviceman warning

With minimum Brightness and Picture, operating high voltage in this receiver is lower than 32.0KV. In case any component having influence on high voltage is replaced, confirm that high voltage with minimum Brightness and Picture is lower than 32.0KV.

To measure H.V. use a high impedance H.V. meter. Connect (−) to chassis earth and (+) to the CRT anode button. (See the following connection diagram).

NOTE: Turn power switch off without fail before the connection with Anode button is made.



X-radiation

TUBE: The primary source of X radiation in this receiver is the picture tube. The tube utilized for the above mentioned function in this chassis is specially constructed to limit X radiation emissions.

For continued X radiation protection, the replacement tube must be the same type as the original, HITACHI approved type.

When trouble shooting and making test measurements in a receiver with a problem of excessive high voltage, avoid being unnecessarily close to the picture tube and the high voltage component.

Do not operate the chassis longer than is necessary to locate the cause excessive voltage.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receiver have special safety related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by making with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, X-radiation, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

TECHNICAL SPECIFICATIONS

ANTENNA INPUT IMPEDANCE 300Ω, 75Ω
CHANNEL COVERAGE
- VHF ..... 2 ~ 13
- UHF ..... 14 ~ 83
- CATV ..... A-5 ~ A-1
  A ~ W
- HYPER BAND ..... AA ~ WW
  AAA ~ WWW

CHANNEL INDICATOR ..... DIGITAL/ON SCREEN
INTERMEDIATE FREQUENCY
- Picture I-F Carrier ..... 45.75 MHz
- Sound I-F Carrier ..... 41.25 MHz
- Sound I-F ..... 4.5 MHz

POWER INPUT ..... AC120/220 Volts, 50/60Hz
POWER RATING 164W

CONVERGENCE ..... Self convergence
FOCUS ..... Electrostatic
SOUND OUTPUT ..... 2W x 2

DIMENSIONS
- W 64.8cm
- H 57.2cm
- D 53.3cm
- WEIGHT ..... Appr. 40.0 kg

TECHNICAL CAUTIONS

[CHECK OF HIGH VOLTAGE HOLD DOWN CIRCUIT]

Checking of the high voltage hold down circuit operation

1. Connect a high voltage voltmenter between the CRT anode and the chassis ground as shown in Fig. 1.
2. Set the AC input voltage to 242V±5V.
3. Set the Brightness and Picture controls to maximum.
4. Connect Equipment-A and set it to fully counterclockwise.
5. Slowly rotate the control knob of Equipment-A clockwise and confirm that picture on the screen disappears at the indication of H.V. meter less than 32.0KV.
6. Turn the switch of the set OFF immediately after checking.
7. Remove the adjusting jig and H.V. meter.

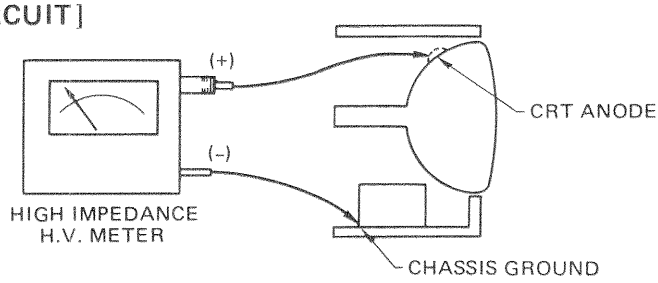


Fig. 1 Connection of H.V. Meter

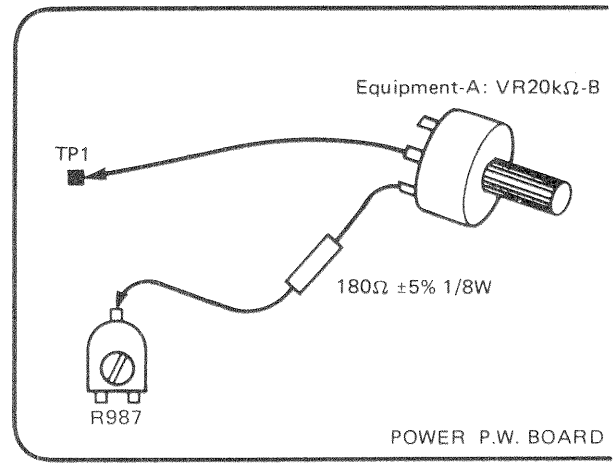
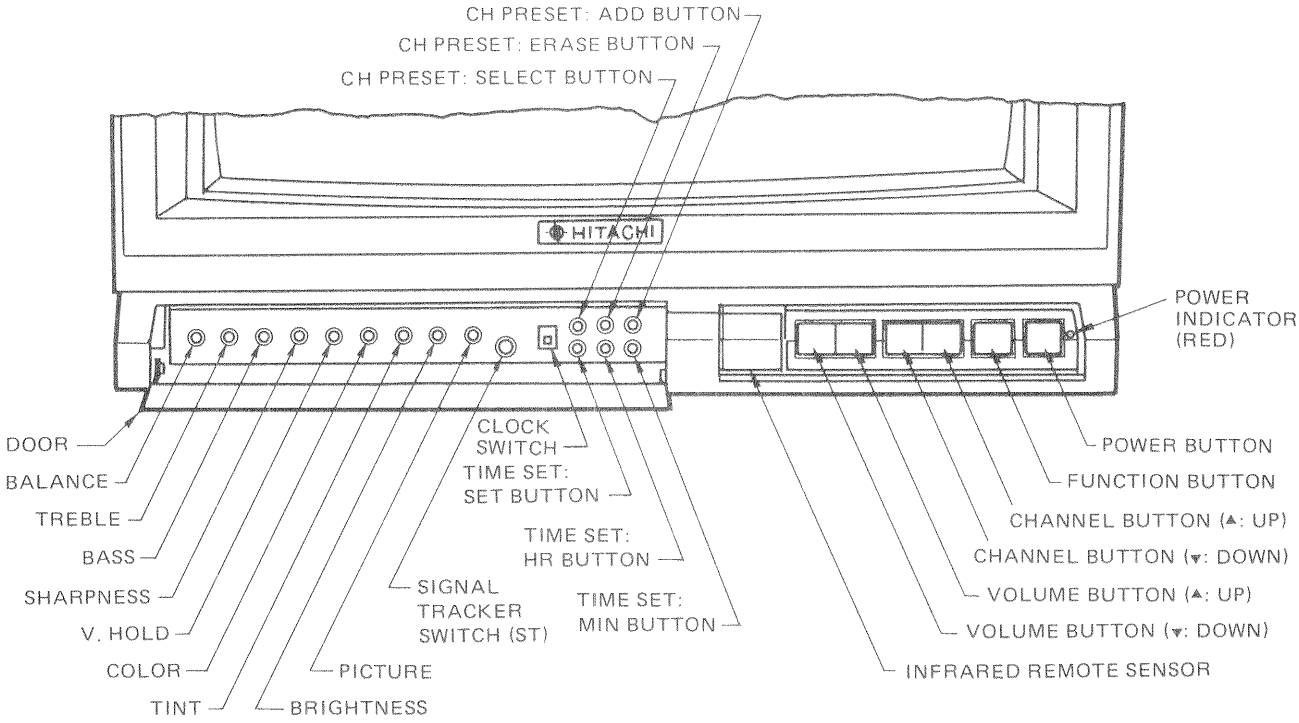
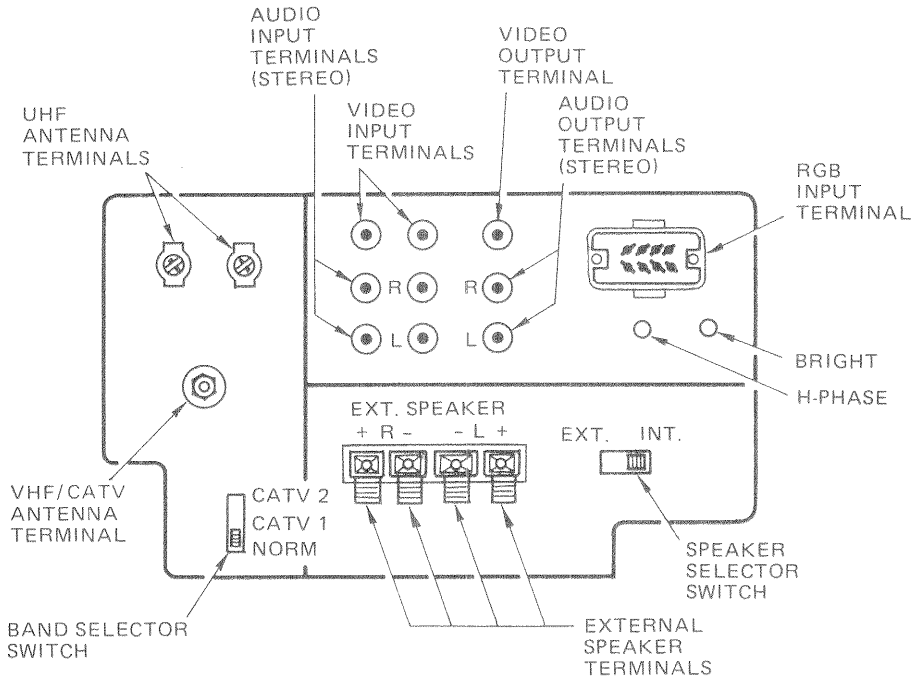


Fig. 2

CONTROLS



BACK PANNEL TERMINALS



OPERATING SUMMARY

1. CHANNEL PRESETING

A special programming circuit in the tuning system allows you to preset into the receiver's memory those channels you prefer to watch. Then, by pressing the CHANNEL BUTTON UP side (▲) or DOWN side (▼), the tuner will advance directly to the next preset channel ..... automatically skipping the unwanted ones. VHF 2-13 channels have been preset at the factory. To erase unwanted channels from the memory or to additional channels available in your area, follow the instructions below in the exact order shown.

1. ELIMINATING UNWANTED CHANNELS –

CHANNEL BUTTON SELECT BUTTON
ERASE BUTTON

(1) Press the CHANNEL BUTTON (▲: UP or ▼: DOWN) to select the unwanted channel.
(2) Press the ERASE BUTTON while pressing the SELECT BUTTON in the door, and the channel is erased from the memory. When you press the SELECT BUTTON at this time, the time indication at the lower right side on the screen changes to "P" and "P" disappears by pressing the ERASE BUTTON. This means that the memory storage mode (indicated by "P") has changed to the memory erase mode ("P" disappears). (See Fig. 3 and Fig. 4)
(3) Repeat item 1 and 2 to erase the memory of other unwanted channels.

2. ADDING DESIRED CHANNELS –

CHANNEL BUTTON SELECT BUTTON
ADD BUTTON

(1) Press the CHANNEL BUTTON (▲: UP or ▼: DOWN) to tune to the desired channel. When you tune the channel using CHANNEL BUTTON, press the CHANNEL BUTTON while pressing the SELECT BUTTON. At this time, the time indication disappears and "P" is not also displayed.
(2) Press the ADD BUTTON while pressing the SELECT BUTTON, and the channel is stored in memory. "P" is indicated at this time. (See Fig. 3 and Fig. 4)
(3) Repeat item 1 and 2 to store other channels in memory.

Note: 1. When all channels have been erase, channels cannot be changed by pressing the CHANNEL BUTTON UP (▲) or DOWN (▼). In this case, press the CHANNEL BUTTON while pressing the SELECT BUTTON.
2. The FUNCTION BUTTON (for selecting external VCR, Video Disc Player or Personal Computer) can not be stored in memory.

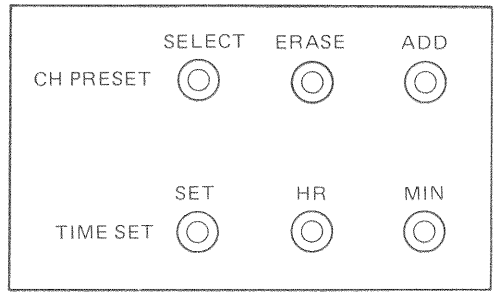


Fig. 3

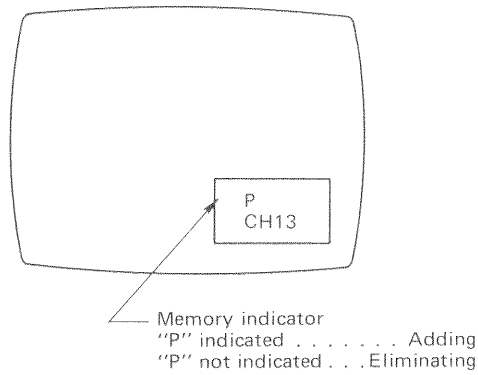


Fig. 4

2. TIME SETTING

Your TV is equipped with a clock circuit and can display the time for your convenience. To set the correct time on your TV, operate as follows.

1. SETTING THE HOUR –

(SET BUTTON) (HR BUTTON)

Push the HR BUTTON while pressing the SET BUTTON until the time display on the screen shows the correct hour.

2. SETTING THE MINUTE –

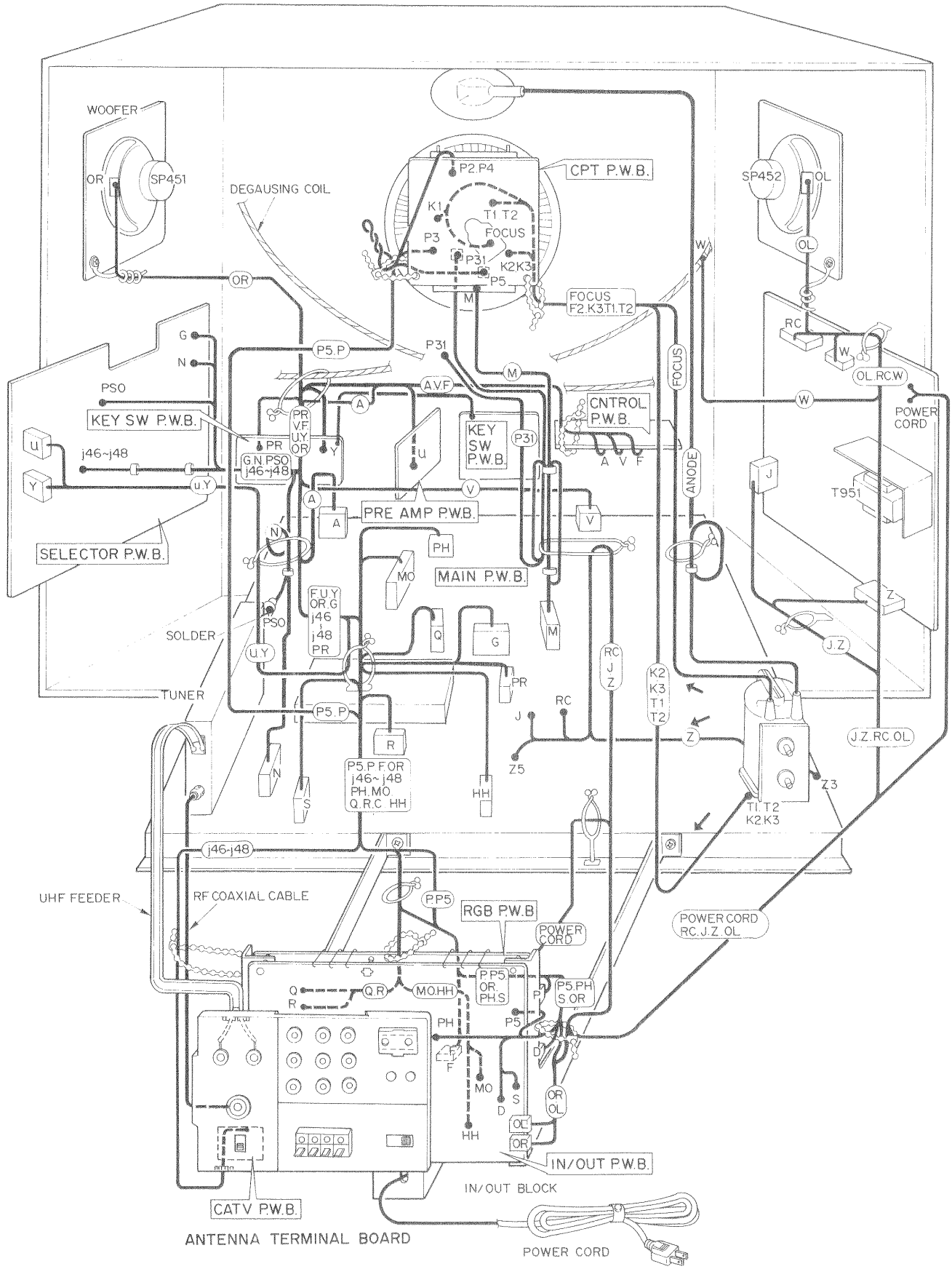
(SET BUTTON) (MIN BUTTON)

Push the MIN BUTTON while pressing the SET BUTTON until the time display on the screen shows the correct minute.

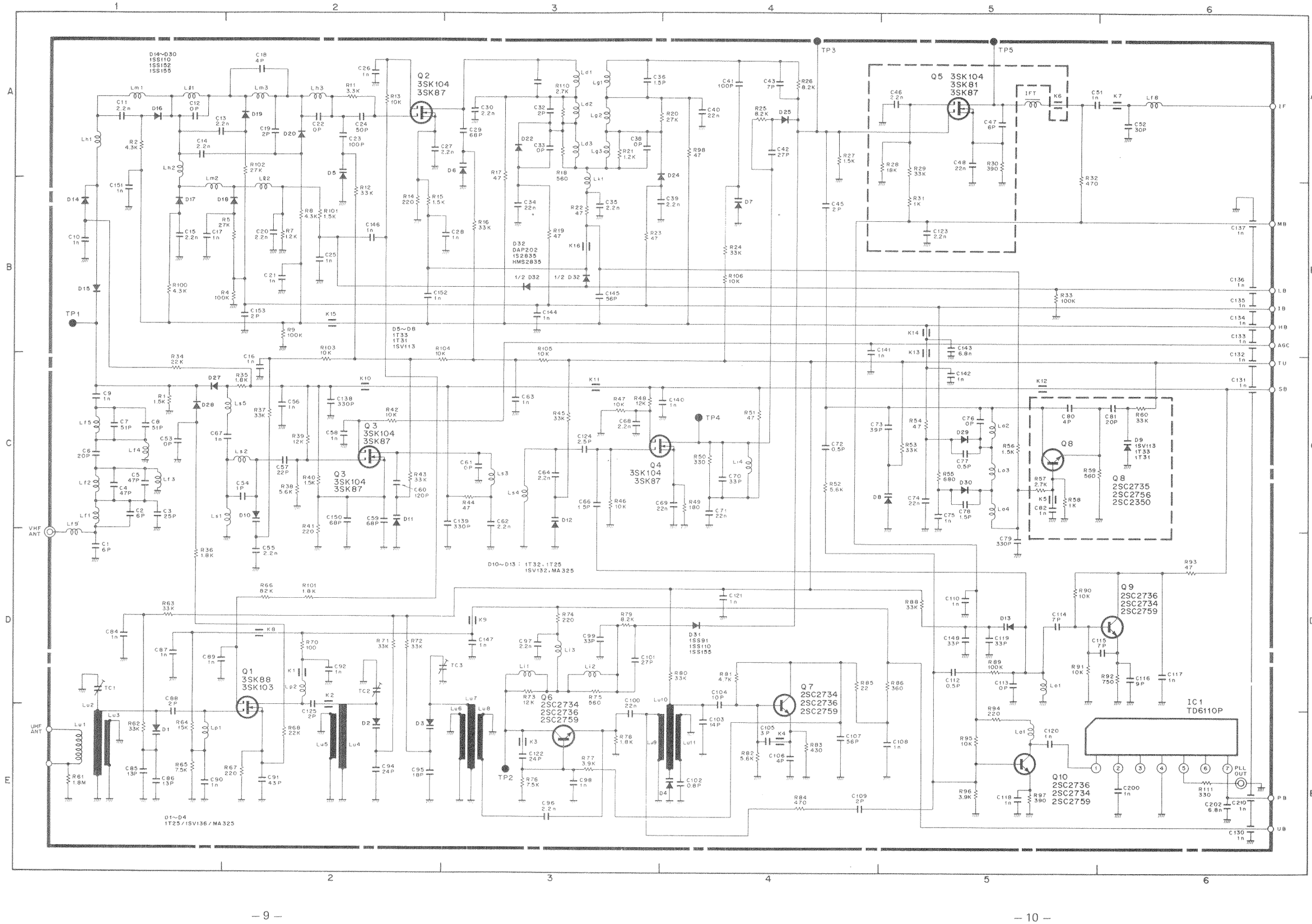
* When pressing the SET BUTTON, the time is displayed at the right lower side of the screen automatically.
* When you have finished time adjustment, the time display disappears after approx. 4 seconds.
* The clock starts operating just after the SET BUTTON is released. When you release the SET BUTTON simultaneously with a time signal, the clock starts from 0 second.

Note:
1. If the time display does not appear on the screen the power to the receiver has been interrupted (power failure, the receiver has been unplugged) and the clock must be reset.
2. When the power cord is unpluged, the clock is stopped. It is better that the power cord is not unpluged except you are going out for along time or not using the set for a period of time.
3. Place the clock switch in the 50Hz position (top) to set the time in an area with a power frequency of 50Hz. Changeover the clock switch after pulling out the power cord from an outlet.

WIRING DIAGRAM



TUNER CIRCUIT DIAGRAM (ET-449)



PROGRAM SELECTOR CIRCUIT

REMO-CON PRE-AMP P.W.B.

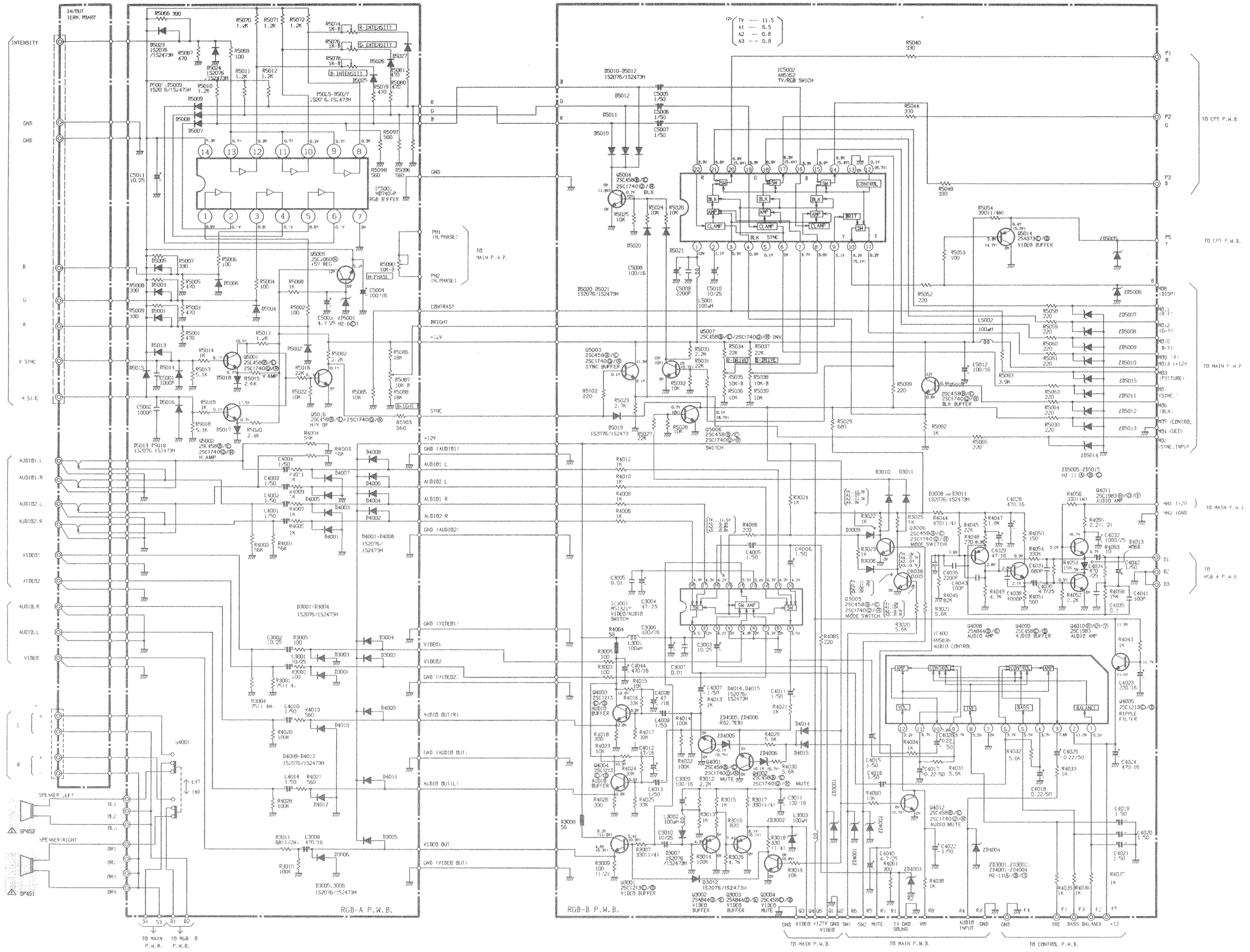
SELECTOR P.W.B. (A)

SELECTOR P.W.B. (B)

SW P.W.B. (B)

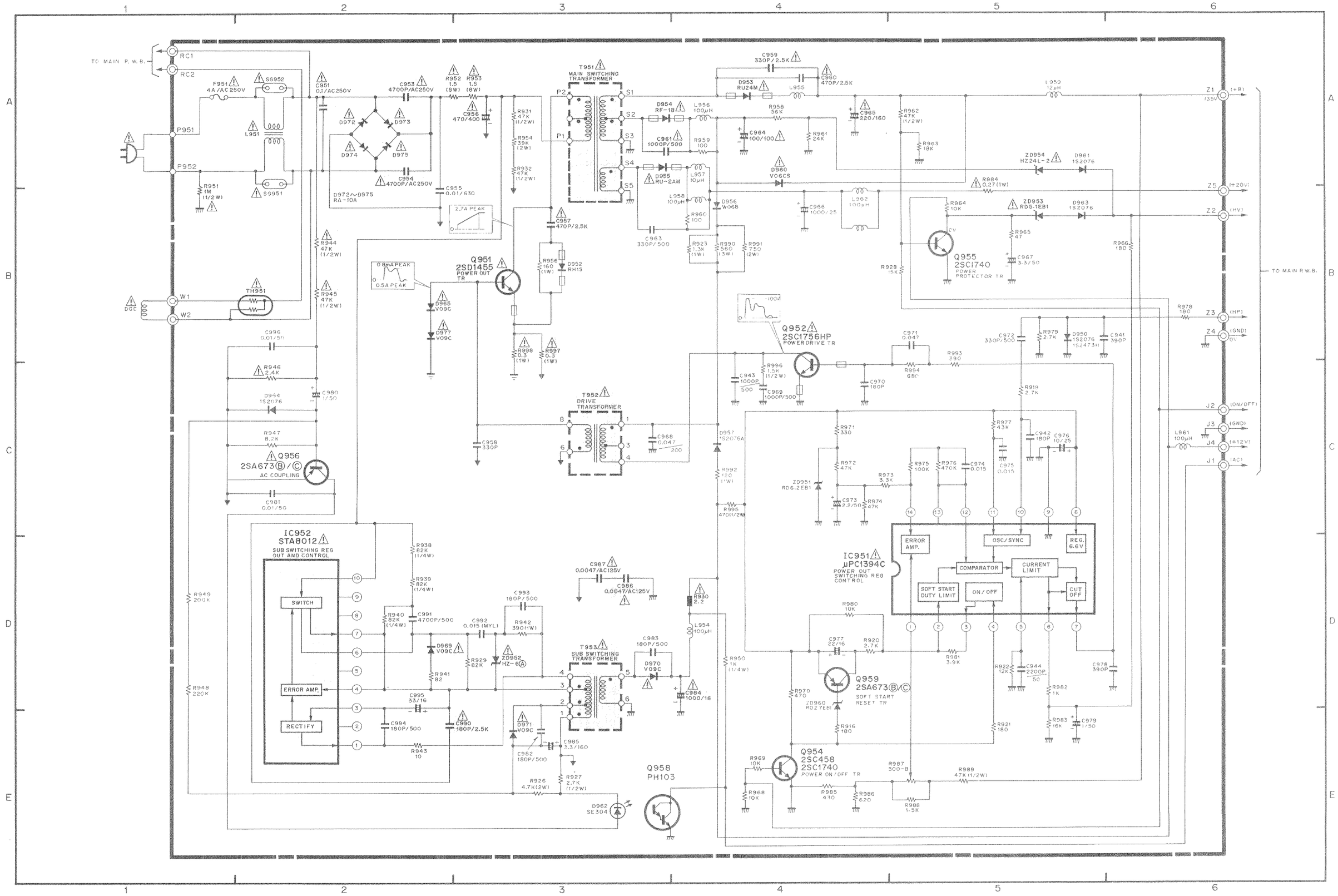
SW P.W.B. (A)

R.G.B. CIRCUIT DIAGRAM



POWER CIRCUIT DIAGRAM

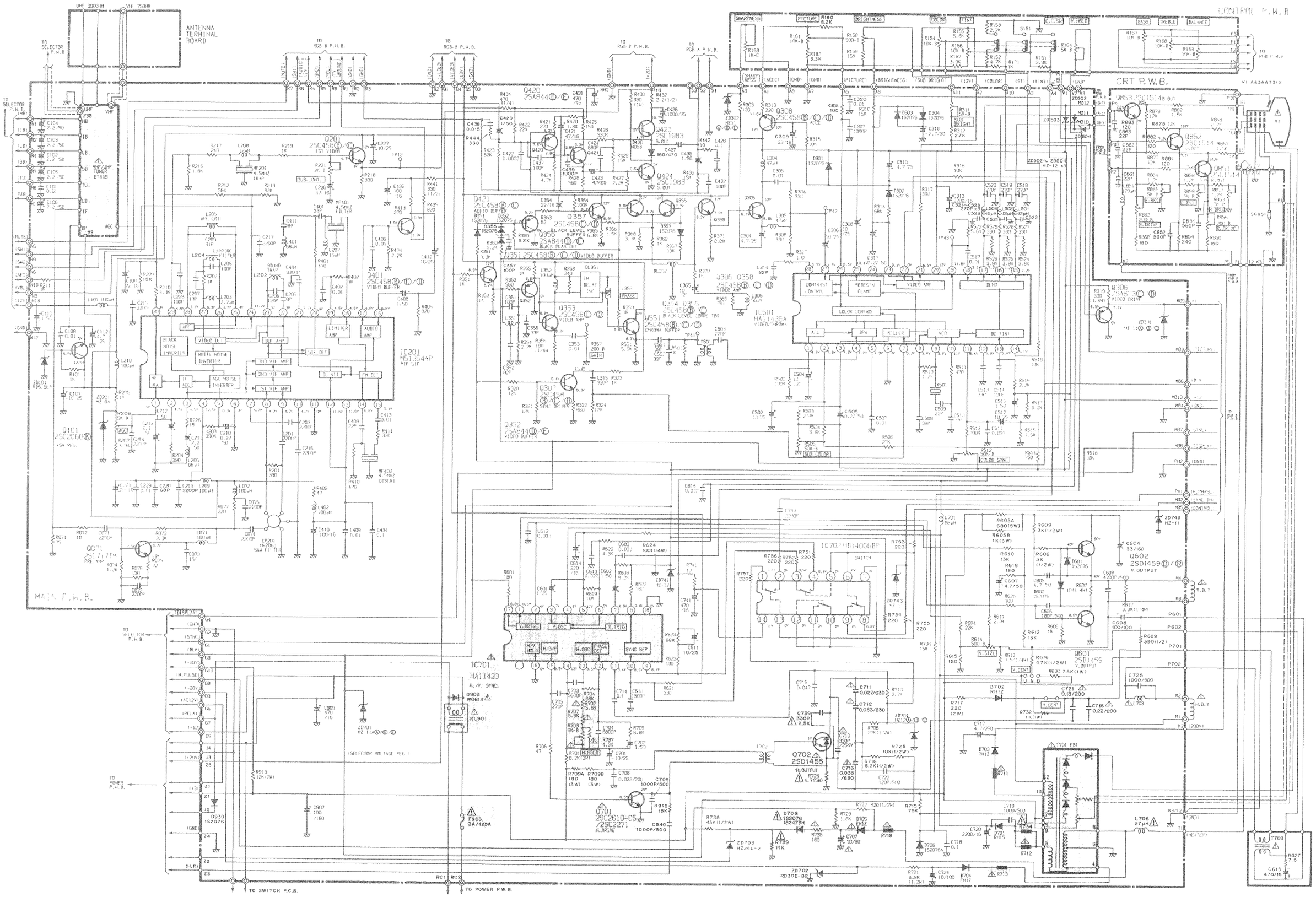
PRODUCT SAFETY NOTE: Components market with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.



- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.
- All DC voltage to be measured with a tester (100kΩ/V).
  Voltage taken on a complex color bar signal including a standard color bar signal.

MAIN CIRCUIT DIAGRAM

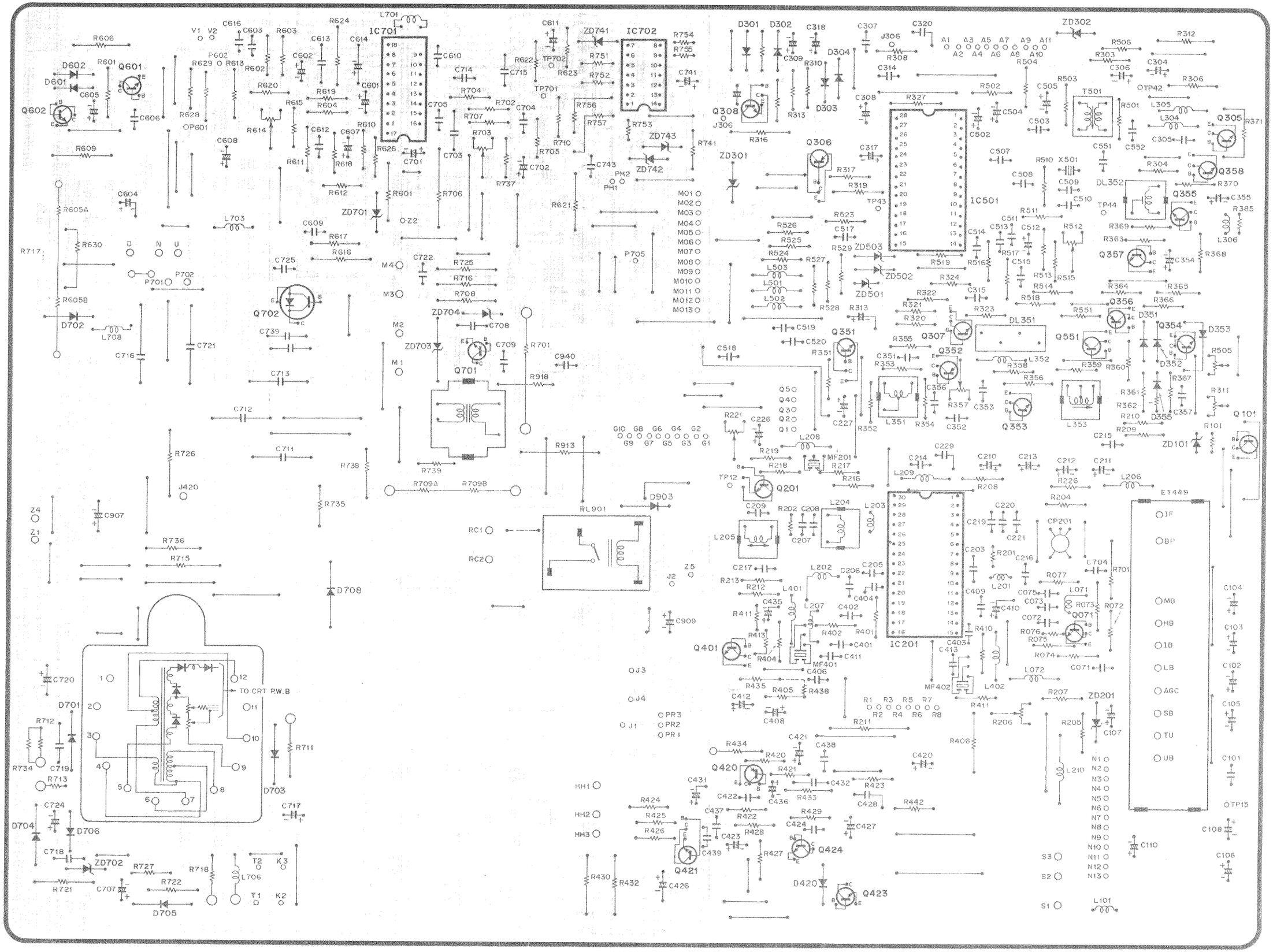
PRODUCT SAFETY NOTE: Components market with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.



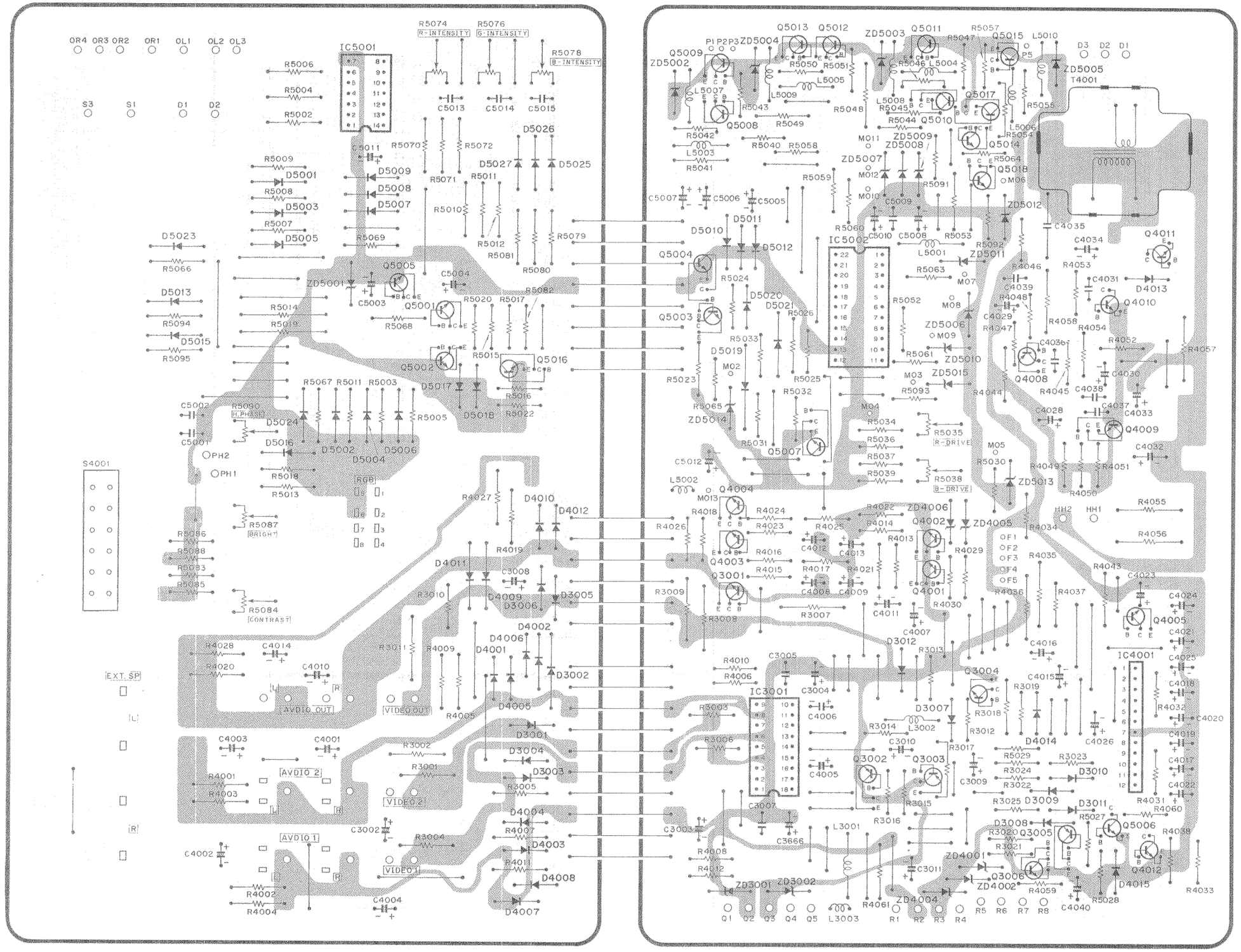
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.
- All DC voltage to be measured with a tester (100kΩ/V).
  Voltage taken on a complex color bar signal including a standard color bar signal.

PRINTED WIRING BOARD

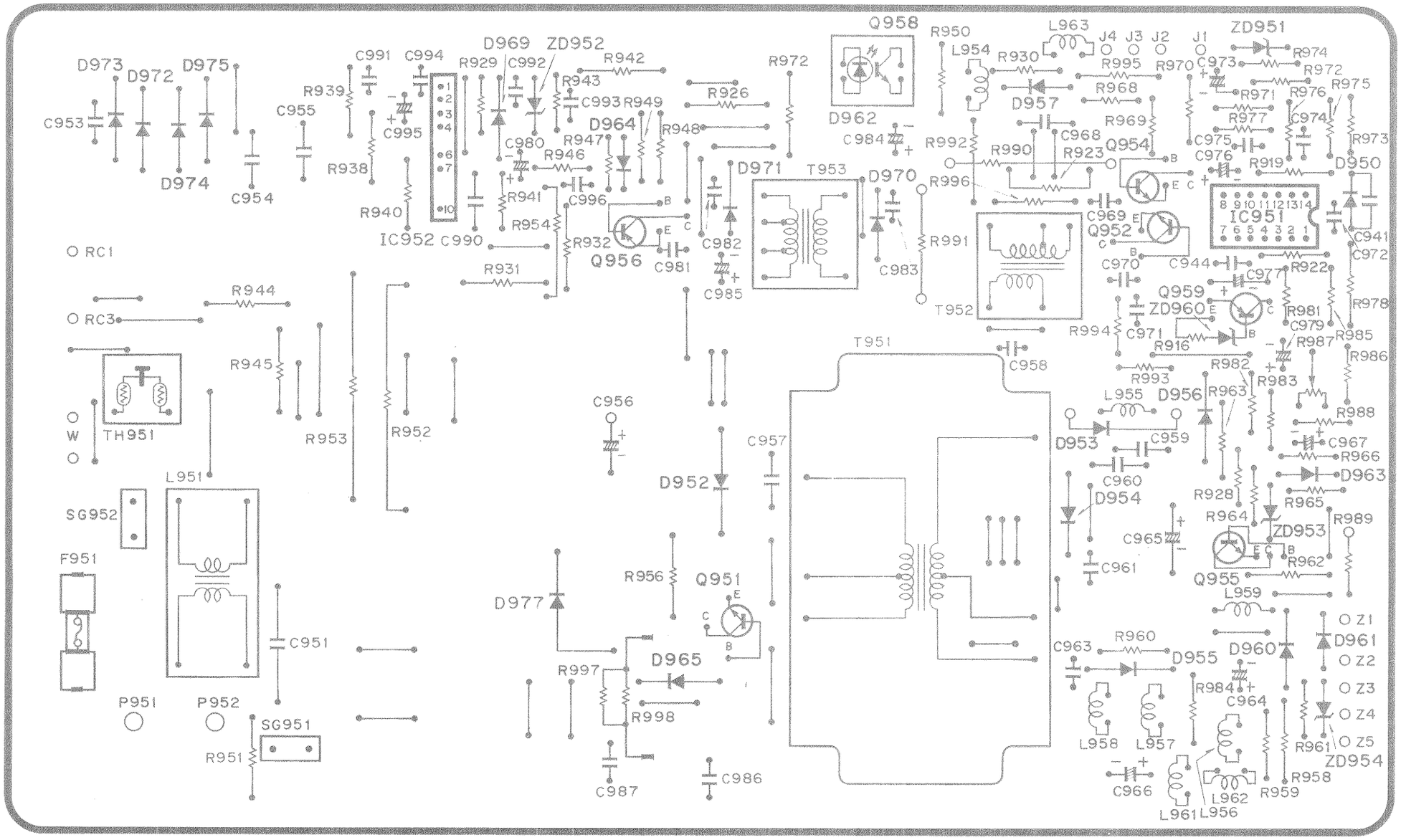
MAIN P.W. BOARD



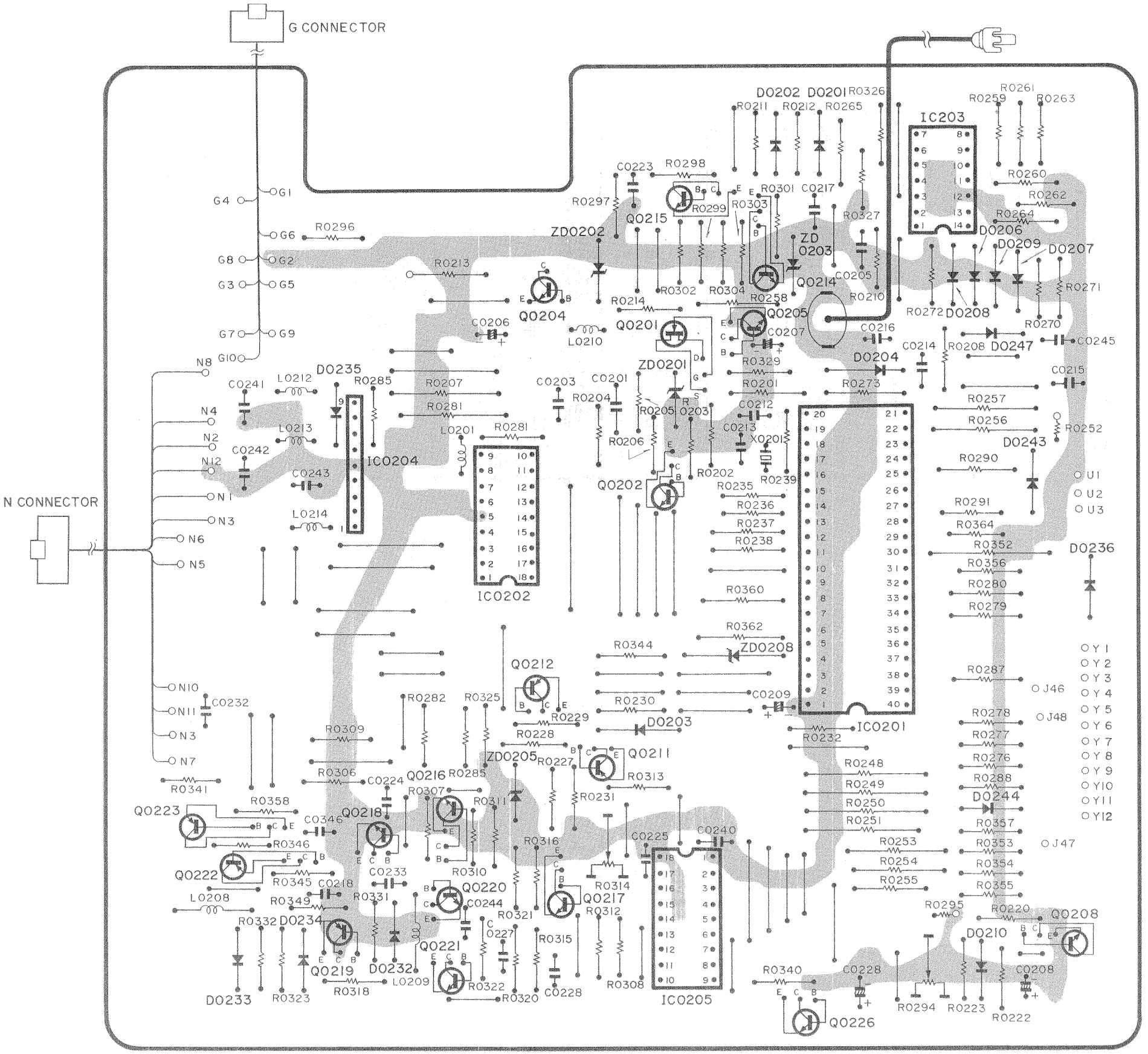
R.G.B. P.W. BOARD


IC5001
IC5002
IC3001
IC4001
R-INTENSITY
G-INTENSITY
B-INTENSITY
H.PHASE
BRIGHT
CONTRAST
R-DRIVE
B-DRIVE
EXT.SP
AVDIO OUT
VIDEO OUT
AVDIO 2
VIDEO 2
AVDIO 1
VIDEO 1
RGB
T4001
L3003

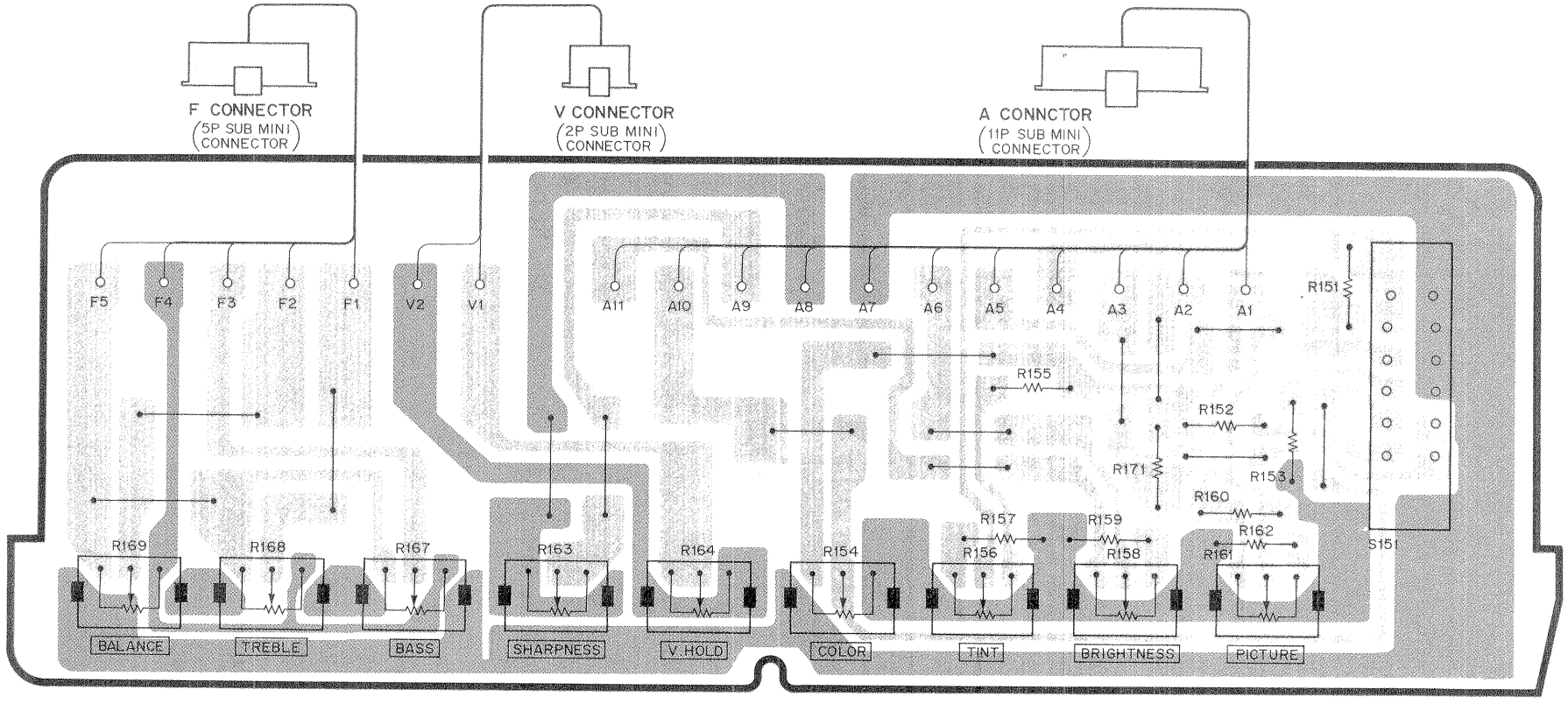
POWER P.W. BOARD



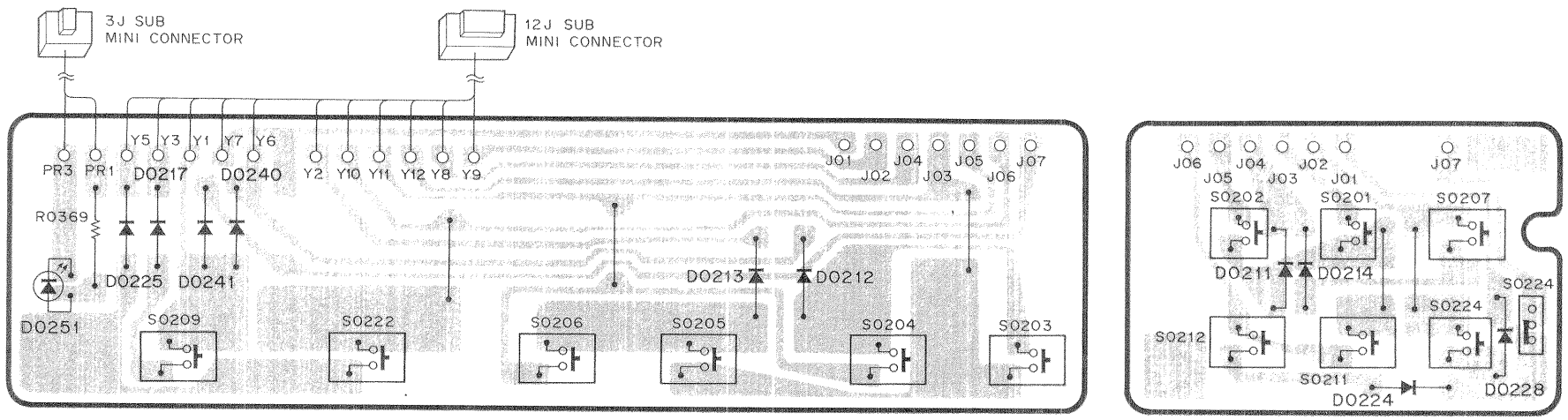
PROGRAM SELECTOR P.W. BOARD



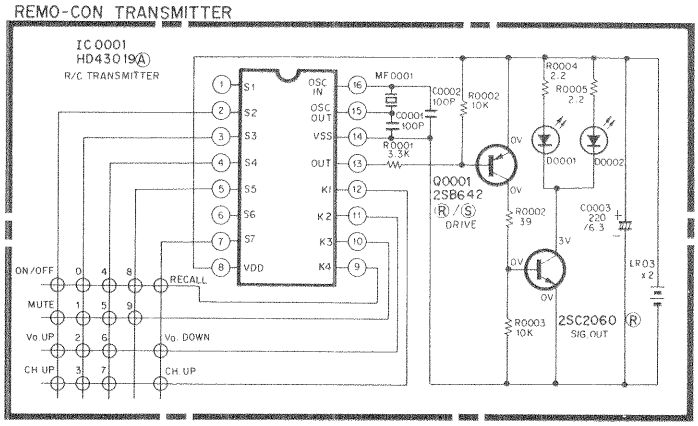
CONTROL P.W. BOARD



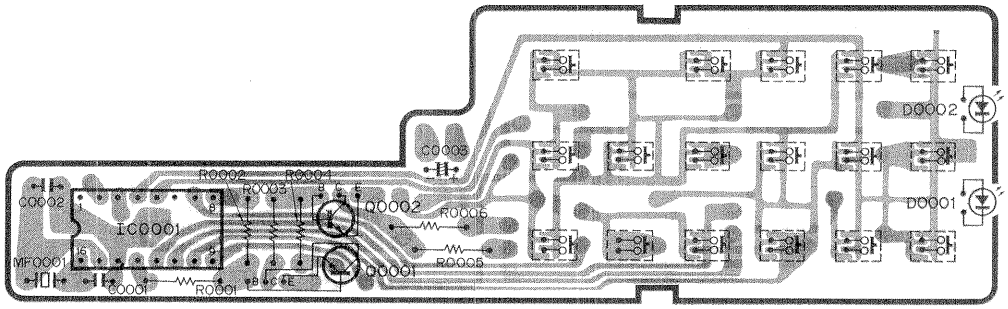
KEY SWITCH P.W. BOARD



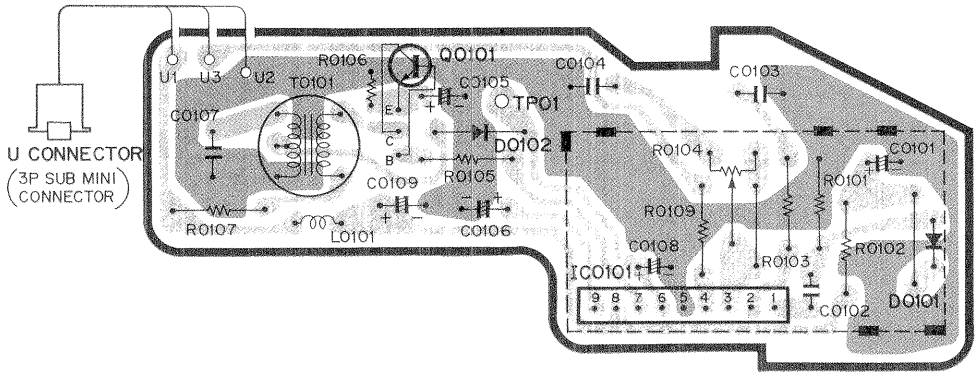
REMOTE CONTROL TRANSMITTER CIRCUIT DIAGRAM



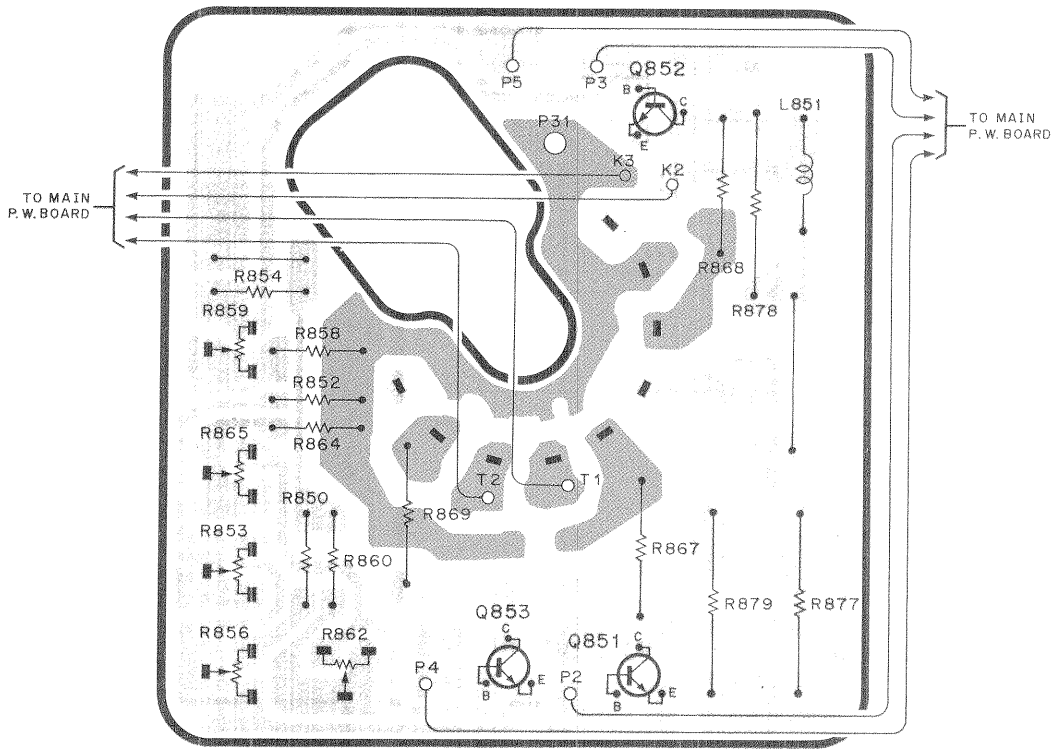
REMOTE CONTROL TRANSMITTER P.W. BOARD



REMOTE CONTROL RECEIVER P.W. BOARD



C.R.T. P.W. BOARD


TO MAIN
P.W.BOARD
P5
P3
Q852
B
C
E
P31
K3
K2
L851
TO MAIN
P.W.BOARD
R854
R859
R858
R852
R865
R864
R868
R878
T2
T1
R850
R869
R853
R860
R867
R879
R877
Q853
R856
R862
P4
Q851
P2

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a Δ have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

ABBREVIATIONS: Capacitors . . . . . CD: Ceramic disk, PF: Polyester film, EL: Electrolytic, PP: Polypropylene, PR: Paper, TA: Tantalum, TM: Trimmer.
Resistors . . . . . CF: Carbon film, CC: Carbon composition, MF: Metal oxide film. VR: Variable resistor, WW: Wire would, FR: Fuse resistor.

SYMBOL NO.	PART NO.	DESCRIPTION
		CAPACITORS
C0001	0248684	CD 100PF +-5% 50V
C0002	0248684	CD 100PF +-5% 50V
C0003	0253011	EL 220MF DC6.3WV
C0101	0252817	EL 2.2MF 50V
C0102	0244117	CD 680PF +-10% 50V
C0103	0277021	PF 0.047MF +-10% 50V
C0104	0277021	PF 0.047MF +-10% 50V
C0105	0252807	EL 0.33MF 50V
C0106	0252621	EL 10MF 25V
C0107	0299990	PP 2200PF +-10% 100V
C0108	0252807	EL 0.33MF 50V
C0109	0252525	EL 47MF 16V
C0201	0277029	PF 0.22MF +-10% 50V
C0203	0277021	PF 0.047MF +-10% 50V
C0205	0277019	PF 0.033MF +-10% 50V
C0206	0253031	EL 220MF 10V
C0207	0253082	EL 1MF 50V
C0208	0253065	EL 4.7MF 25V
C0209	0253082	EL 1MF 50V
C0210	0277013	PF 0.01MF +-10% 50V
C0212	0246448	CD 22PF +-5% 50V
C0213	0246420	CD 10PF +-0.5% 50V
C0214	0277013	PF 0.01MF +-10% 50V
C0215	0277013	PF 0.01MF +-10% 50V
C0216	0253030	EL 100MF 10V
C0217	0277025	PF 0.1MF +-10% 50V
C0218	0277001	PF 1000PF +-10% 50V
C0219	0277001	PF 1000PF +-10% 50V
C0223	0277017	PF 0.022MF +-10% 50V
C0224	0277011	PF 6800 PF+-10% 50V
C0225	0248684	CD 100PF +-5% 50V
C0226	0248692	CD 220PF +-5% 50V
C0227	0248692	CD 220PF +-5% 50V
C0228	0253051	EL 220MF 16V
C0232	0248684	CD 100PF +-5% 50V
C0240	0277013	PF 0.01MF +-10% 50V
C0241	0277001	PF 1000PF +-10% 50V
C0242	0277001	PF 1000PF +-10% 50V
C0243	0277001	PF 1000PF +-10% 50V
C0244	0248640	CD 150PF +-0.25PF 50V
C0245	0277021	PF 0.047MF +-10% 50V
C0247	0277013	PF 0.01MF +-10% 50V
C0250	0253048	EL 33MF 16V
C0271	0244105	CD 2200PF +-10% 50V
C0272	0244105	CD 2200PF +-10% 50V
C0273	0246444	CD 15PF +-5% 50V
C0274	0244105	CD 2200PF +-10% 50V
C0275	0244105	CD 2200PF +-10% 50V
C1101	0277013	PF 0.01MF +-10% 50V
C1102	0253083	EL 2.2MF 50V
C1103	0253083	EL 2.2MF 50V
C1104	0253083	EL 2.2MF 50V
C1105	0253083	EL 2.2MF 50V
C1106	0253083	EL 2.2MF 50V
C1107	0253066	EL 10MF 25V
C1108	0253047	EL 22MF 16V
C1109	0277013	PF 0.01MF +-10% 50V
C1110	0253082	EL 1MF 50V
C1112	0253065	EL 4.7MF 25V
C2101	0244105	CD 2200PF +-10% 50V
C2103	0244105	CD 2200PF +-10% 50V
C2105	0246418	CD 8PF +-0.25PF 50V
C2106	0246466	CD 120PF +-5% 50V
C2107	0246443	CD 13PF +-5% 50V
C2108	0246464	CD 100PF +-5% 50V
C2109	0246463	CD 91PF +-5% 50V
C2110	0252806	EL 0.22MF 50V
C2111	0253083	EL 2.2MF 50V
C2112	0253082	EL 1MF 50V
C2113	0252805	EL 0.1MF 50V
C2114	0244105	CD 2200PF +-10% 50V
C2115	0244105	CD 2200PF +-10% 50V
C2116	0244105	CD 2200PF +-10% 50V
C2117	0244105	CD 2200PF +-10% 50V
C2119	0244105	CD 2200PF +-10% 50V
C2120	0248680	CD 68PF +-5% 50V
C2121	0253047	EL 22MF 16V
C2126	0253049	EL 47MF 16V
C2127	0253066	EL 10MF 25V
C2128	0248684	CD 100PF +-5% 50V
C2129	0277013	PF 0.01MF +-10% 50V
C3001	0253066	EL 10MF 25V
C3002	0253066	EL 10MF 25V
C3003	0253066	EL 10MF 25V
C3004	0253069	EL 47MF 25V

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SYMBOL NO.	PART NO.	DESCRIPTION
C3005	0276823	PF 0.01MF +-5% 50V
C3006	0253050	EL 100MF 16V
C3007	0276823	PF 0.01MF +-5% 50V
C3008	0253053	EL 470MF 16V
C3009	0253050	EL 100MF 16V
C3010	0253066	EL 10MF 25V
C3011	0253050	EL 100MF 16V
C304	0253065	EL 4.7MF 25V
C305	0277013	PF 0.01MF +-10% 50V
C306	0253066	EL 10MF 25V
C307	0244139	CD 1000PF +-10% 50V
C308	0253066	EL 10MF 25V
C309	0253048	EL 33MF 16V
C310	0253065	EL 4.7MF 25V
C313	0253055	EL 2200MF 16V
C314	0248682	CD 82PF +-5% 50V
C315	0244113	CD 330PF +-10% 50V
C317	0252806	EL 0.22MF 50V
C318	0253083	EL 2.2MF 50V
C320	0277013	PF 0.01MF +-10% 50V
C351	0248684	CD 100PF +-5% 50V
C352	0248682	CD 82PF +-5% 50V
C353	0277013	PF 0.01MF +-10% 50V
C354	0253047	EL 22MF 16V
C355	0253066	EL 10MF 25V
C356	0248672	CD 33PF +-5% 50V
C357	0248684	CD 100PF +-5% 50V
C4001	0253082	EL 1MF 50V
C4002	0253082	EL 1MF 50V
C4003	0253082	EL 1MF 50V
C4004	0253082	EL 1MF 50V
C4005	0253082	EL 1MF 50V
C4006	0253082	EL 1MF 50V
C4007	0253082	EL 1MF 50V
C4008	0253049	EL 47MF 16V
C4009	0253082	EL 1MF 50V
C401	0248672	CD 33PF +-5% 50V
C4010	0253082	EL 1MF 50V
C4011	0253082	EL 1MF 50V
C4012	0253049	EL 47MF 16V
C4013	0253082	EL 1MF 50V
C4014	0253082	EL 1MF 50V
C4015	0253082	EL 1MF 50V
C4016	0253082	EL 1MF 50V
C4017	0252806	EL 0.22MF 50V
C4018	0252806	EL 0.22MF 50V
C4019	0253082	EL 1MF 50V
C402	0244171	CD 0.01MF +80-20% 50V
C4020	0253082	EL 1MF 50V
C4021	0253082	EL 1MF 50V
C4022	0253082	EL 1MF 50V
C4023	0253051	EL 220MF 16V
C4024	0253053	EL 470MF 16V
C4025	0252806	EL 0.22MF 50V
C4026	0252806	EL 0.22MF 50V
C4028	0253053	EL 470MF 16V
C4029	0253049	EL 47MF 16V
C403	0246448	CD 22PF +-5% 50V
C4030	0253065	EL 4.7MF 25V
C4031	0244117	CD 680PF +-10% 50V
C4032	0253074	EL 1000MF 25V
C4034	0253073	EL 470MF 25V
C4035	0277025	PF 0.1MF +-10% 50V
C4036	0244105	CD 2200PF +-10% 50V
C4038	0244139	CD 1000PF +-10% 50V
C4039	0277015	PF 0.015MF +-10% 50V
C404	0244107	CD 3300PF +-10% 50V
C4040	0253065	EL 4.7MF 25V
C4041	0248684	CD 100PF +-5% 50V
C4042	0253082	EL 1MF 50V
C4043	0248684	CD 100PF +-5% 50V
C4044	0253053	EL 470MF 16V
C406	0244171	CD 0.01MF +80-20% 50V
C408	0253082	EL 1MF 50V
C409	0244171	CD 0.01MF +80-20% 50V
C410	0253050	EL 100MF 16V
C411	0248680	CD 68PF +-5% 50V
C412	0253066	EL 10MF 25V
C413	0276823	PF 0.01MF +-5% 50V
C420	0253082	EL 1MF 50V
C421	0253049	EL 47MF 16V
C422	0244105	CD 2200PF +-10% 50V
C423	0253065	EL 4.7MF 25V
C424	0244117	CD 680PF +-10% 50V
C426	0253074	EL 1000MF 25V
C427	0253073	EL 470MF 25V
C428	0277025	PF 0.1MF +-10% 50V
C431	0253053	EL 470MF 16V
C432	0248684	CD 100PF +-5% 50V
C434	0277025	PF 0.1MF +-10% 50V
C435	0253050	EL 100MF 16V
C436	0253082	EL 1MF 50V
C437	0248684	CD 100PF +-5% 50V
C438	0277015	PF 0.015MF +-10% 50V
C439	0244139	CD 1000PF +-10% 50V
C5001	0244139	CD 1000PF +-10% 50V
C5002	0244139	CD 1000PF +-10% 50V
C5003	0253065	EL 4.7MF 25V
C5004	0253050	EL 100MF 16V
C5005	0253082	EL 1MF 50V

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SYMBOL NO.	PART NO.	DESCRIPTION	SYMBOL NO.	PART NO.	DESCRIPTION
C5006	0253082	EL 1MF 50V	⚠ C707	0253086	EL 10MF 50V
C5007	0253082	EL 1MF 50V	C708	0299918	PP 0.022MF +-10% 200V
C5008	0253050	EL 100MF 16V	C709	0244501	CD 1000PF +-10% 500V
C5009	0244105	CD 2200PF +-10% 50V	⚠ C710	0243837	CD 330PF +-10% 2.5KV
C5010	0253066	EL 10MF 25V	⚠ C711	0299995	PP 0.027MF +-5% 630V
C5011	0253066	EL 10MF 25V	⚠ C712	0299996	PP 0.033MF +-5% 630V
C5012	0253050	EL 100MF 16V	⚠ C713	0299996	PP 0.033MF +-5% 630V
C502	0253066	EL 10MF 25V	C714	0277025	PF 0.1MF +-10% 50V
C503	0248692	CD 220PF +-5% 50V	C715	0277021	PF 0.047MF +-10% 50V
C504	0253066	EL 10MF 25V	⚠ C716	0299930	PP 0.22MF +-10% 200V
C505	0252806	EL 0.22MF 50V	C717	0259842	EL 4.7MF 250V (NR)
C507	0277013	PF 0.01MF +-10% 50V	C718	0277025	PF 0.1MF +-10% 50V
C508	0246454	CD 39PF +-5% 50V	C719	0244501	CD 1000PF +-10% 500V
C509	0246448	CD 22PF +-5% 50V	C720	0253055	EL 2200MF 16V
C510	0246450	CD 27PF +-5% 50V	⚠ C721	0299929	PP 0.18MF +-10% 200V
C511	0277019	PF 0.033MF +-10% 50V	C722	0247856	CD 120PF +-5% 500V
C512	0253066	EL 10MF 25V	C724	0253286	EL 10MF 100V
C513	0248672	CD 33PF +-5% 50V	C725	0244501	CD 1000PF +-10% 500V
C514	0248684	CD 100PF +-5% 50V	⚠ C739	0243837	CD 330PF +-10% 2.5KV
C515	0253082	EL 1MF 50V	C741	0253053	EL 470MF 16V
C517	0277013	PF 0.01MF +-10% 50V	C743	0244105	CD 2200PF +-10% 50V
C518	0244136	CD 270 PF+-10% 50V	C851	0244115	CD 560PF +-10% 50V
C519	0244136	CD 270 PF+-10% 50V	C852	0244115	CD 560PF +-10% 50V
C520	0244136	CD 270 PF+-10% 50V	C853	0244115	CD 560PF +-10% 50V
C521	0244136	CD 270 PF+-10% 50V	C861	0248668	CD 22PF +-5% 50V
C522	0244136	CD 270 PF+-10% 50V	C862	0248668	CD 22PF +-5% 50V
C523	0244136	CD 270 PF+-10% 50V	C863	0248668	CD 22PF +-5% 50V
C551	0248674	CD 39PF +-5% 50V	C907	0259857	EL 100MF 160V
C552	0248674	CD 39PF +-5% 50V	C909	0253053	EL 470MF 16V
C601	0292706	PP 1MF 25V	C940	0244501	CD 1000PF +-10% 500V
C602	0253082	EL 1MF 50V	C941	0244119	CD 390PF +-10% 50V
C603	0277019	PF 0.033MF +-10% 50V	C942	0244116	CD 180PF +-10% 50V
C604	0253058	EL 33 MF 160V	C943	0244501	CD 1000PF +-10% 500V
C605	0253085	EL 4.7MF 50V	C944	0276815	PF 2200PF +-5% 50V
C606	0243504	CD 180PF +-10% 500V	⚠ C951	0299529	PP 0.1MF 250V
C607	0252815	EL 5MF 50V	⚠ C953	0249159	CD 4700PF +100-0% AC125V
C608	0253290	EL 100MF 100V	⚠ C954	0249159	CD 4700PF +100-0% AC125V
C609	0244565	CD 4700PF +100-0% 500V	C955	0299981	PP 0.01MF +-5% 630V
C610	0244103	CD 1500PF +-10% 50V	⚠ C956	0259102	EL 470MF 400V
C611	0253066	EL 10MF 25V	⚠ C957	0243824	CD 470PF +-1% 2.5KV
C612	0277019	PF 0.033MF +-10% 50V	C958	0244113	CD 330PF +-10% 50V
C613	0277017	PF 0.022MF +-10% 50V	⚠ C959	0243837	CD 330PF +-10% 2.5KV
C614	0252532	EL 220MF 16V	⚠ C960	0243824	CD 470PF +-10% 2.5KV
C615	0253054	EL 1000MF 16V	⚠ C961	0244501	CD 1000PF +-10% 500V
C616	0277017	PF 0.022MF +-10% 50V	C963	0243507	CD 330PF +-10% 500V
C701	0253066	EL 10MF 25V	⚠ C964	0253290	EL 100MF 100V
C702	0253082	EL 1MF 50V	⚠ C965	0259899	EL 220MF 160V
C703	0279211	PF 5600PF 50V	C966	0252636	EL 1000MF 25V
C704	0244111	CD 6800PF +- 0% 50V	C967	0253084	EL 3.3MF 50V
C705	0244136	CD 270 PF+-10% 50V	C968	0299922	PP 0.047MF +-10% 200V

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SYMBOL NO.	PART NO.	DESCRIPTION
C969	0244501	CD 1000PF +-10% 500V
C970	0243504	CD 180PF +-10% 500V
C971	0276831	PF 0.047MF +-10% 50V
C972	0243507	CD 330PF +-10% 500V
C973	0253083	EL 2.2MF 50V
C974	0276825	PF 0.015MF +-5% 50V
C975	0276815	PF 2200PF +-5% 50V
C976	0253066	EL 10MF 25V
C977	0253047	EL 22MF 16V
C978	0244119	CD 390PF +-10% 50V
C979	0253082	EL 1MF 50V
C980	0253082	EL 1MF 50V
C981	0244171	CD 0.01MF +80-20% 50V
C982	0243504	CD 180PF +-10% 500V
C983	0243504	CD 180PF +-10% 500V
⚠ C984	0252712	EL 1000MF 16V
C985	0253454	EL 3.3 MF 160V
⚠ C986	0249150	CD 4700PF AC125V
⚠ C987	0249150	CD 4700PF AC125V
⚠ C990	0243839	CD 180PF +-10% 2.5KV
C991	0244565	CD 4700PF +100-0% 500V
C992	0277015	PF 0.015MF +-10% 50V
C993	0243504	CD 180PF +-10% 500V
C994	0243504	CD 180PF +-10% 500V
C995	0253048	EL 33MF 16V
C996	0244171	CD 0.01MF +80-20% 50V
RESISTORS		
R0001	0187075	CF 2.7K OHM +-5% 1/16W
R0002	0187089	CF 10K OHM +-5% 1/16W
R0003	0187031	CF 39 OHM +-5% 1/16W
R0004	0187089	CF 10K OHM +-5% 1/16W
R0005	0100001	CF 2.2 OHM +-5% 1/8W
R0006	0100001	CF 2.2 OHM +-5% 1/8W
R0101	0100113	CF 100K OHM +-5% 1/8W
R0102	0100075	CF 2.7K OHM +-5% 1/8W
R0103	0100049	CF 220 OHM +-5% 1/8W
R0104	0150036	VR 2K OHM-B RS-8
R0105	0100061	CF 680 OHM +-5% 1/8W
R0106	0100045	CF 150 OHM +-5% 1/8W
R0107	0100053	CF 330 OHM +-5% 1/8W
R0109	0100083	CF 5.6K OHM +-5% 1/8W
R0201	0100077	CF 3.3K OHM +-5% 1/8W
R0202	0100093	CF 15K OHM +-5% 1/8W
R0203	0100077	CF 3.3K OHM +-5% 1/8W
R0204	0100109	CF 68K OHM +-5% 1/8W
R0205	0100057	CF 470 OHM +-5% 1/8W
R0206	0100099	CF 27K OHM +-5% 1/8W
R0207	0100061	CF 680 OHM +-5% 1/8W

SYMBOL NO.	PART NO.	DESCRIPTION
R0208	0100089	CF 10K OHM +-5% 1/8W
R0210	0100107	CF 56K OHM +-5% 1/8W
R0211	0100049	CF 220 OHM +-5% 1/8W
R0212	0100093	CF 15K OHM +-5% 1/8W
R0213	0110117	MF 68 OHM +-5% 1W
R0214	0100065	CF 1K OHM +-5% 1/8W
R0219	0100081	CF 4.7K OHM +-5% 1/8W
R0220	0100089	CF 10K OHM +-5% 1/8W
R0222	0100081	CF 4.7K OHM +-5% 1/8W
R0223	0100081	CF 4.7K OHM +-5% 1/8W
R0227	0100081	CF 4.7K OHM +-5% 1/8W
R0228	0100073	CF 2.2K OHM +-5% 1/8W
R0229	0100107	CF 56K OHM +-5% 1/8W
R0230	0100107	CF 56K OHM +-5% 1/8W
R0231	0100065	CF 1K OHM +-5% 1/8W
R0232	0100107	CF 56K OHM +-5% 1/8W
R0235	0100083	CF 5.6K OHM +-5% 1/8W
R0236	0100083	CF 5.6K OHM +-5% 1/8W
R0237	0100083	CF 5.6K OHM +-5% 1/8W
R0238	0100083	CF 5.6K OHM +-5% 1/8W
R0239	0100117	CF 150K OHM +-5% 1/8W
R0248	0100089	CF 10K OHM +-5% 1/8W
R0249	0100089	CF 10K OHM +-5% 1/8W
R0250	0100089	CF 10K OHM +-5% 1/8W
R0251	0100089	CF 10K OHM +-5% 1/8W
R0252	0100113	CF 100K OHM +-5% 1/8W
R0253	0100113	CF 100K OHM +-5% 1/8W
R0254	0100113	CF 100K OHM +-5% 1/8W
R0255	0100113	CF 100K OHM +-5% 1/8W
R0256	0100089	CF 10K OHM +-5% 1/8W
R0257	0100113	CF 100K OHM +-5% 1/8W
R0258	0100065	CF 1K OHM +-5% 1/8W
R0259	0100089	CF 10K OHM +-5% 1/8W
R0260	0100097	CF 22K OHM +-5% 1/8W
R0261	0100083	CF 5.6K OHM +-5% 1/8W
R0262	0100077	CF 3.3K OHM +-5% 1/8W
R0263	0100087	CF 8.2K OHM +-5% 1/8W
R0264	0100086	CF 7.5K OHM +-5% 1/8W
R0265	0100065	CF 1K OHM +-5% 1/8W
R0270	0100089	CF 10K OHM +-5% 1/8W
R0271	0100089	CF 10K OHM +-5% 1/8W
R0272	0100113	CF 100K OHM +-5% 1/8W
R0273	0100073	CF 2.2K OHM +-5% 1/8W
R0276	0100065	CF 1K OHM +-5% 1/8W
R0277	0100065	CF 1K OHM +-5% 1/8W
R0278	0100065	CF 1K OHM +-5% 1/8W
R0279	0100073	CF 2.2K OHM +-5% 1/8W
R0280	0100073	CF 2.2K OHM +-5% 1/8W
R0281	0100065	CF 1K OHM +-5% 1/8W
R0282	0100089	CF 10K OHM +-5% 1/8W

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SYMBOL NO.	PART NO.	DESCRIPTION
R0283	0100089	CF 10K OHM +-5% 1/8W
R0285	0100083	CF 5.6K OHM +-5% 1/8W
R0287	0100065	CF 1K OHM +-5% 1/8W
R0288	0100065	CF 1K OHM +-5% 1/8W
R0290	0100065	CF 1K OHM +-5% 1/8W
R0294	0150039	VR RS-8 20 KOHM-B
R0295	0100113	CF 100K OHM +-5% 1/8W
R0296	0100111	CF 82K OHM +-5% 1/8W
R0297	0100111	CF 82K OHM +-5% 1/8W
R0298	0100077	CF 3.3K OHM +-5% 1/8W
R0299	0100081	CF 4.7K OHM +-5% 1/8W
R0301	0100047	CF 180 OHM +-5% 1/8W
R0302	0100097	CF 22K OHM +-5% 1/8W
R0303	0100113	CF 100K OHM +-5% 1/8W
R0304	0100081	CF 4.7K OHM +-5% 1/8W
R0306	0100097	CF 22K OHM +-5% 1/8W
R0307	0100079	CF 3.9K OHM +-5% 1/8W
R0308	0100089	CF 10K OHM +-5% 1/8W
R0309	0100093	CF 15K OHM +-5% 1/8W
R0310	0100093	CF 15K OHM +-5% 1/8W
R0311	0100089	CF 10K OHM +-5% 1/8W
R0312	0100089	CF 10K OHM +-5% 1/8W
R0313	0100053	CF 330 OHM +-5% 1/8W
R0314	0150036	VR 2K OHM-B RS-8
R0315	0100081	CF 4.7K OHM +-5% 1/8W
R0316	0100089	CF 10K OHM +-5% 1/8W
R0318	0100077	CF 3.3K OHM +-5% 1/8W
R0320	0100081	CF 4.7K OHM +-5% 1/8W
R0321	0100089	CF 10K OHM +-5% 1/8W
R0322	0100063	CF 820 OHM +-5% 1/8W
R0323	0100045	CF 150 OHM +-5% 1/8W
R0325	0100097	CF 22K OHM +-5% 1/8W
R0326	0100091	CF 12K OHM +-5% 1/8W
R0327	0100069	CF 1.5K OHM +-5% 1/8W
R0328	0100089	CF 10K OHM +-5% 1/8W
R0329	0100073	CF 2.2K OHM +-5% 1/8W
R0331	0100055	CF 390 OHM +-5% 1/8W
R0332	0100065	CF 1K OHM +-5% 1/8W
R0340	0100083	CF 5.6K OHM +-5% 1/8W
R0341	0100053	CF 330 OHM +-5% 1/8W
R0344	0100077	CF 3.3K OHM +-5% 1/8W
R0345	0100089	CF 10K OHM +-5% 1/8W
R0346	0100097	CF 22K OHM +-5% 1/8W
R0349	0100065	CF 1K OHM +-5% 1/8W
R0352	0100081	CF 4.7K OHM +-5% 1/8W
R0353	0100065	CF 1K OHM +-5% 1/8W
R0354	0100065	CF 1K OHM +-5% 1/8W
R0355	0100065	CF 1K OHM +-5% 1/8W
R0356	0100065	CF 1K OHM +-5% 1/8W
R0357	0100065	CF 1K OHM +-5% 1/8W
R0358	0100089	CF 10K OHM +-5% 1/8W
R0360	0100081	CF 4.7K OHM +-5% 1/8W
R0361	0100065	CF 1K OHM +-5% 1/8W
R0362	0100065	CF 1K OHM +-5% 1/8W
R0364	0100117	CF 150K OHM +-5% 1/8W
R0365	0100061	CF 680 OHM +-5% 1/8W
R0366	0100083	CF 5.6K OHM +-5% 1/8W
R0367	0100107	CF 56K OHM +-5% 1/8W
R0369	0114161	CF 1K OHM +-5% 1/4W
R0370	0100047	CF 180 OHM +-5% 1/8W
R071	0100038	CF 75 OHM +-5% 1/8W
R072	0100017	CF 10 OHM +-5% 1/8W
R073	0100077	CF 3.3K OHM +-5% 1/8W
R074	0100067	CF 1.2K OHM +-5% 1/8W
R075	0100025	CF 22 OHM +-5% 1/8W
R076	0100045	CF 150 OHM +-5% 1/8W
R077	0100049	CF 220 OHM +-5% 1/8W
R101	0100065	CF 1K OHM +-5% 1/8W
R151	0100079	CF 3.9K OHM +-5% 1/8W
R152	0100081	CF 4.7K OHM +-5% 1/8W
R153	0100075	CF 2.7K OHM +-5% 1/8W
R154	0150433	VR RV-12 10K OHM-B
R155	0100083	CF 5.6K OHM +-5% 1/8W
R156	0150433	VR RV-12 10K OHM-B
R157	0100079	CF 3.9K OHM +-5% 1/8W
R158	0150429	VR 500 OHM-B RV-12
R159	0100093	CF 15K OHM +-5% 1/8W
R160	0100075	CF 2.7K OHM +-5% 1/8W
R161	0150433	VR RV-12 10K OHM-B
R162	0100071	CF 1.8K OHM +-5% 1/8W
R163	0150431	VR RV-12 1K OHM-C
R164	0150423	VR RV-12 5K OHM-B
R167	0150424	VR RV-12 10KOHM-B
R168	0150424	VR RV-12 10KOHM-B
R169	0150433	VR RV-12 10K OHM-B
R171	0100065	CF 1K OHM +-5% 1/8W
R201	0100053	CF 330 OHM +-5% 1/8W
R202	0100065	CF 1K OHM +-5% 1/8W
R203	0100127	CF 390K OHM +-5% 1/8W
R204	0100055	CF 390 OHM +-5% 1/8W
R205	0100065	CF 1K OHM +-5% 1/8W
R206	0150037	VR 5K OHM-B RS-8
R207	0100079	CF 3.9K OHM +-5% 1/8W
R209	0100093	CF 15K OHM +-5% 1/8W
R210	0100080	CF 4.3K OHM +-5% 1/8W
R211	0100065	CF 1K OHM +-5% 1/8W
R212	0100107	CF 56K OHM +-5% 1/8W
R213	0100111	CF 82K OHM +-5% 1/8W
R216	0100071	CF 1.8K OHM +-5% 1/8W

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SYMBOL NO.	PART NO.	DESCRIPTION
R217	0100050	CF 240 OHM +-5% 1/8W
R218	0100053	CF 330 OHM +-5% 1/8W
R219	0100065	CF 1K OHM +-5% 1/8W
R221	0150036	VR 2K OHM-B RS-8
R226	0100023	CF 18 OHM +-5% 1/8W
R3001	0114062	CF 75 OHM +-5% 1/4W
R3002	0100041	CF 100 OHM +-5% 1/8W
R3003	0100041	CF 100 OHM +-5% 1/8W
R3004	0114062	CF 75 OHM +-5% 1/4W
R3005	0100041	CF 100 OHM +-5% 1/8W
R3006	0100041	CF 100 OHM +-5% 1/8W
R3007	0114143	CF 330 OHM +-5% 1/4W
R3008	0119508	FR 56 OHM +-5% 1/4W
R3009	0113725	CF 100 OHM +-5% 1/2W
R3010	0100113	CF 100K OHM +-5% 1/8W
R3011	0113721	CF 68 OHM +-5% 1/2W
R3012	0100073	CF 2.2K OHM +-5% 1/8W
R3013	0100065	CF 1K OHM +-5% 1/8W
R3014	0100113	CF 100K OHM +-5% 1/8W
R3015	0100065	CF 1K OHM +-5% 1/8W
R3016	0100063	CF 820 OHM +-5% 1/8W
R3017	0114143	CF 330 OHM +-5% 1/4W
R3018	0114143	CF 330 OHM +-5% 1/4W
R3019	0100089	CF 10K OHM +-5% 1/8W
R3020	0100083	CF 5.6K OHM +-5% 1/8W
R3021	0100083	CF 5.6K OHM +-5% 1/8W
R3022	0100065	CF 1K OHM +-5% 1/8W
R3023	0100065	CF 1K OHM +-5% 1/8W
R3024	0100065	CF 1K OHM +-5% 1/8W
R3025	0100065	CF 1K OHM +-5% 1/8W
R3026	0100081	CF 4.7K OHM +-5% 1/8W
R303	0100043	CF 120 OHM +-5% 1/8W
R304	0100053	CF 330 OHM +-5% 1/8W
R306	0100053	CF 330 OHM +-5% 1/8W
R308	0100041	CF 100 OHM +-5% 1/8W
R310	0100093	CF 15K OHM +-5% 1/8W
R311	0151716	VR 5K OHM-B RV-8
R312	0100075	CF 2.7K OHM +-5% 1/8W
R313	0100049	CF 220 OHM +-5% 1/8W
R314	0100109	CF 68K OHM +-5% 1/8W
R315	0100089	CF 10K OHM +-5% 1/8W
R316	0100089	CF 10K OHM +-5% 1/8W
R317	0100055	CF 390 OHM +-5% 1/8W
R319	0114145	CF 390 OHM +-5% 1/4W
R320	0100091	CF 12K OHM +-5% 1/8W
R321	0100091	CF 12K OHM +-5% 1/8W
R322	0100061	CF 680 OHM +-5% 1/8W
R323	0100065	CF 1K OHM +-5% 1/8W
R324	0100091	CF 12K OHM +-5% 1/8W
R327	0100041	CF 100 OHM +-5% 1/8W
R351	0100065	CF 1K OHM +-5% 1/8W
R352	0100065	CF 1K OHM +-5% 1/8W
R353	0100059	CF 560 OHM +-5% 1/8W
R354	0100073	CF 2.2K OHM +-5% 1/8W
R355	0100065	CF 1K OHM +-5% 1/8W
R356	0114137	CF 180 OHM +-5% 1/4W
R357	0150017	VR 200 OHM-B
R358	0100050	CF 240 OHM +-5% 1/8W
R359	0100065	CF 1K OHM +-5% 1/8W
R360	0100087	CF 8.2K OHM +-5% 1/8W
R361	0100077	CF 3.3K OHM +-5% 1/8W
R362	0100067	CF 1.2K OHM +-5% 1/8W
R363	0100039	CF 82 OHM +-5% 1/8W
R364	0100113	CF 100K OHM +-5% 1/8W
R365	0100085	CF 6.8K OHM +-5% 1/8W
R366	0100069	CF 1.5K OHM +-5% 1/8W
R367	0100089	CF 10K OHM +-5% 1/8W
R368	0100077	CF 3.3K OHM +-5% 1/8W
R369	0100065	CF 1K OHM +-5% 1/8W
R370	0100065	CF 1K OHM +-5% 1/8W
R371	0100073	CF 2.2K OHM +-5% 1/8W
R385	0100062	CF 750 OHM +-5% 1/8W
R4001	0100107	CF 56K OHM +-5% 1/8W
R4002	0100107	CF 56K OHM +-5% 1/8W
R4003	0100107	CF 56K OHM +-5% 1/8W
R4004	0100107	CF 56K OHM +-5% 1/8W
R4005	0100065	CF 1K OHM +-5% 1/8W
R4006	0100065	CF 1K OHM +-5% 1/8W
R4007	0100065	CF 1K OHM +-5% 1/8W
R4008	0100065	CF 1K OHM +-5% 1/8W
R4009	0100065	CF 1K OHM +-5% 1/8W
R401	0100057	CF 470 OHM +-5% 1/8W
R4010	0100065	CF 1K OHM +-5% 1/8W
R4011	0100065	CF 1K OHM +-5% 1/8W
R4012	0100065	CF 1K OHM +-5% 1/8W
R4013	0100065	CF 1K OHM +-5% 1/8W
R4014	0100113	CF 100K OHM +-5% 1/8W
R4015	0100089	CF 10K OHM +-5% 1/8W
R4016	0100101	CF 33K OHM +-5% 1/8W
R4017	0100101	CF 33K OHM +-5% 1/8W
R4018	0100053	CF 330 OHM +-5% 1/8W
R4019	0100059	CF 560 OHM +-5% 1/8W
R402	0100065	CF 1K OHM +-5% 1/8W
R4020	0100113	CF 100K OHM +-5% 1/8W
R4021	0100065	CF 1K OHM +-5% 1/8W
R4022	0100113	CF 100K OHM +-5% 1/8W
R4023	0100089	CF 10K OHM +-5% 1/8W
R4024	0100101	CF 33K OHM +-5% 1/8W
R4025	0100101	CF 33K OHM +-5% 1/8W
R4026	0100053	CF 330 OHM +-5% 1/8W

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SYMBOL NO.	PART NO.	DESCRIPTION
R4027	0100059	CF 560 OHM +-5% 1/8W
R4028	0100113	CF 100K OHM +-5% 1/8W
R4029	0100083	CF 5.6K OHM +-5% 1/8W
R4030	0100083	CF 5.6K OHM +-5% 1/8W
R4031	0100083	CF 5.6K OHM +-5% 1/8W
R4032	0100083	CF 5.6K OHM +-5% 1/8W
R4033	0100065	CF 1K OHM +-5% 1/8W
R4034	0100065	CF 1K OHM +-5% 1/8W
R4035	0100065	CF 1K OHM +-5% 1/8W
R4036	0100065	CF 1K OHM +-5% 1/8W
R4037	0100065	CF 1K OHM +-5% 1/8W
R4038	0100065	CF 1K OHM +-5% 1/8W
R404	0100073	CF 2.2K OHM +-5% 1/8W
R4043	0100065	CF 1K OHM +-5% 1/8W
R4044	0114147	CF 470 OHM +-5% 1/4W
R4045	0100097	CF 22K OHM +-5% 1/8W
R4046	0100111	CF 82K OHM +-5% 1/8W
R4047	0100071	CF 1.8K OHM +-5% 1/8W
R4048	0100051	CF 270 OHM +-5% 1/8W
R4049	0100081	CF 4.7K OHM +-5% 1/8W
R405	0100063	CF 820 OHM +-5% 1/8W
R4050	0100045	CF 150 OHM +-5% 1/8W
R4051	0100059	CF 560 OHM +-5% 1/8W
R4052	0100073	CF 2.2K OHM +-5% 1/8W
R4053	0100093	CF 15K OHM +-5% 1/8W
R4054	0100125	CF 330K OHM +-5% 1/8W
R4055	0113684	CF 2.2 OHM +-5% 1/2W
R4056	0110133	MF 330 OHM +-5% 1W
R4058	0100093	CF 15K OHM +-5% 1/8W
R406	0110113	MF 47 OHM +-5% 1W
R4060	0100089	CF 10K OHM +-5% 1/8W
R4061	0100052	CF 300 OHM +-5% 1/8W
R4063	0100017	CF 10 OHM +-5% 1/8W
R4064	0119508	FR 56 OHM +-5% 1/4W
R4065	0100049	CF 220 OHM +-5% 1/8W
R4066	0100049	CF 220 OHM +-5% 1/8W
R410	0100057	CF 470 OHM +-5% 1/8W
R411	0100053	CF 330 OHM +-5% 1/8W
R413	0100051	CF 270 OHM +-5% 1/8W
R420	0100071	CF 1.8K OHM +-5% 1/8W
R421	0100051	CF 270 OHM +-5% 1/8W
R422	0100097	CF 22K OHM +-5% 1/8W
R423	0100111	CF 82K OHM +-5% 1/8W
R424	0100081	CF 4.7K OHM +-5% 1/8W
R425	0100045	CF 150 OHM +-5% 1/8W
R426	0100059	CF 560 OHM +-5% 1/8W
R427	0100073	CF 2.2K OHM +-5% 1/8W
R428	0100125	CF 330K OHM +-5% 1/8W
R429	0100093	CF 15K OHM +-5% 1/8W
R430	0110133	MF 330 OHM +-5% 1W
R432	0113684	CF 2.2 OHM +-5% 1/2W
R433	0100093	CF 15K OHM +-5% 1/8W
R434	0100057	CF 470 OHM +-5% 1/8W
R435	0100063	CF 820 OHM +-5% 1/8W
R440	0100053	CF 330 OHM +-5% 1/8W
R441	0113737	CF 330 OHM +-5% 1/2W
R442	0100017	CF 10 OHM +-5% 1/8W
R5001	0100057	CF 470 OHM +-5% 1/8W
R5002	0100041	CF 100 OHM +-5% 1/8W
R5003	0100057	CF 470 OHM +-5% 1/8W
R5004	0100041	CF 100 OHM +-5% 1/8W
R5005	0100057	CF 470 OHM +-5% 1/8W
R5006	0100041	CF 100 OHM +-5% 1/8W
R5007	0100053	CF 330 OHM +-5% 1/8W
R5008	0100053	CF 330 OHM +-5% 1/8W
R5009	0100053	CF 330 OHM +-5% 1/8W
R501	0100065	CF 1K OHM +-5% 1/8W
R5010	0100067	CF 1.2K OHM +-5% 1/8W
R5011	0100067	CF 1.2K OHM +-5% 1/8W
R5012	0100067	CF 1.2K OHM +-5% 1/8W
R5013	0100082	CF 5.1K OHM +-5% 1/8W
R5014	0100065	CF 1K OHM +-5% 1/8W
R5015	0100074	CF 2.4K OHM +-5% 1/8W
R5016	0100097	CF 22K OHM +-5% 1/8W
R5017	0100067	CF 1.2K OHM +-5% 1/8W
R5018	0100082	CF 5.1K OHM +-5% 1/8W
R5019	0100065	CF 1K OHM +-5% 1/8W
R502	0100113	CF 100K OHM +-5% 1/8W
R5020	0100074	CF 2.4K OHM +-5% 1/8W
R5022	0100089	CF 10K OHM +-5% 1/8W
R5023	0100075	CF 2.7K OHM +-5% 1/8W
R5024	0100089	CF 10K OHM +-5% 1/8W
R5025	0100089	CF 10K OHM +-5% 1/8W
R5026	0100089	CF 10K OHM +-5% 1/8W
R5027	0100097	CF 22K OHM +-5% 1/8W
R5028	0100089	CF 10K OHM +-5% 1/8W
R5029	0100061	CF 680 OHM +-5% 1/8W
R503	0100121	CF 220K OHM +-5% 1/8W
R5030	0100049	CF 220 OHM +-5% 1/8W
R5031	0100097	CF 22K OHM +-5% 1/8W
R5032	0100089	CF 10K OHM +-5% 1/8W
R5033	0100073	CF 2.2K OHM +-5% 1/8W
R5034	0100097	CF 22K OHM +-5% 1/8W
R5035	0150038	VR 10K OHM-B RS-8
R5036	0100089	CF 10K OHM +-5% 1/8W
R5037	0100097	CF 22K OHM +-5% 1/8W
R5038	0150038	VR 10K OHM-B RS-8
R5039	0100089	CF 10K OHM +-5% 1/8W
R504	0100079	CF 3.9K OHM +-5% 1/8W
R5040	0100053	CF 330 OHM +-5% 1/8W

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SYMBOL NO.	PART NO.	DESCRIPTION	SYMBOL NO.	PART NO.	DESCRIPTION
R5044	0100053	CF 330 OHM +-5% 1/8W	R519	0100089	CF 10K OHM +-5% 1/8W
R5048	0100053	CF 330 OHM +-5% 1/8W	R523	0100083	CF 5.6K OHM +-5% 1/8W
R505	0150084	VR 50K OHM-B RS-8	R524	0100079	CF 3.9K OHM +-5% 1/8W
R5052	0100049	CF 220 OHM +-5% 1/8W	R525	0100079	CF 3.9K OHM +-5% 1/8W
R5053	0100041	CF 100 OHM +-5% 1/8W	R526	0100079	CF 3.9K OHM +-5% 1/8W
R5054	0114145	CF 390 OHM +-5% 1/4W	R527	0100053	CF 330 OHM +-5% 1/8W
R5058	0100049	CF 220 OHM +-5% 1/8W	R528	0100053	CF 330 OHM +-5% 1/8W
R5059	0100049	CF 220 OHM +-5% 1/8W	R529	0100053	CF 330 OHM +-5% 1/8W
R506	0100099	CF 27K OHM +-5% 1/8W	R551	0100083	CF 5.6K OHM +-5% 1/8W
R5060	0100049	CF 220 OHM +-5% 1/8W	R601	0100047	CF 180 OHM +-5% 1/8W
R5061	0100049	CF 220 OHM +-5% 1/8W	R602	0100047	CF 180 OHM +-5% 1/8W
R5063	0100049	CF 220 OHM +-5% 1/8W	R603	0100087	CF 8.2K OHM +-5% 1/8W
R5064	0100049	CF 220 OHM +-5% 1/8W	R604	0100097	CF 22K OHM +-5% 1/8W
R5065	0100049	CF 220 OHM +-5% 1/8W	R605A	0111772	MF 680 OHM +-5% 5W
R5066	0100055	CF 390 OHM +-5% 1/8W	R605B	0110345	MF 1K OHM +-5% 3W
R5067	0100057	CF 470 OHM +-5% 1/8W	R606	0113761	CF 3K OHM +-5% 1/2W
R5068	0100065	CF 1K OHM +-5% 1/8W	R607	0114041	CF 10 OHM +-5% 1/4W
R5069	0100041	CF 100 OHM +-5% 1/8W	R608	0100065	CF 1K OHM +-5% 1/8W
R5070	0100067	CF 1.2K OHM +-5% 1/8W	R609	0113761	CF 3K OHM +-5% 1/2W
R5071	0100067	CF 1.2K OHM +-5% 1/8W	R610	0100092	CF 13K OHM +-5% 1/8W
R5072	0100067	CF 1.2K OHM +-5% 1/8W	R611	0100073	CF 2.2K OHM +-5% 1/8W
R5074	0150035	VR 1K OHM-B RS-8	R612	0100092	CF 13K OHM +-5% 1/8W
R5076	0150035	VR 1K OHM-B RS-8	R613	0114014	CF 7.5 OHM +-5% 1/4W
R5078	0150035	VR 1K OHM-B RS-8	R614	0150034	VR 500 OHM-B RS-8
R5079	0100057	CF 470 OHM +-5% 1/8W	R615	0100045	CF 150 OHM +-5% 1/8W
R5080	0100057	CF 470 OHM +-5% 1/8W	R616	0113766	CF 4.7K OHM +-5% 1/2W
R5081	0100057	CF 470 OHM +-5% 1/8W	R617	0114173	CF 3.3K OHM +-5% 1/4W
R5082	0100073	CF 2.2K OHM +-5% 1/8W	R618	0100047	CF 180 OHM +-5% 1/8W
R5085	0100089	CF 10K OHM +-5% 1/8W	R619	0100089	CF 10K OHM +-5% 1/8W
R5086	0100095	CF 18K OHM +-5% 1/8W	R620	0100080	CF 4.3K OHM +-5% 1/8W
R5087	0150038	VR 10K OHM-B RS-8	R621	0100053	CF 330 OHM +-5% 1/8W
R5088	0100095	CF 18K OHM +-5% 1/8W	R622	0100041	CF 100 OHM +-5% 1/8W
R5090	0150038	VR 10K OHM-B RS-8	R623	0100109	CF 68K OHM +-5% 1/8W
R5092	0100065	CF 1K OHM +-5% 1/8W	R624	0113725	CF 100 OHM +-5% 1/2W
R5093	0100079	CF 3.9K OHM +-5% 1/8W	R626	0100041	CF 100 OHM +-5% 1/8W
R5096	0100059	CF 560 OHM +-5% 1/8W	R627	0113697	CF 7.5 OHM +-5% 1/2W
R5097	0100059	CF 560 OHM +-5% 1/8W	R629	0113737	CF 330 OHM +-5% 1/2W
R5098	0100059	CF 560 OHM +-5% 1/8W	R630	0110166	MF 7.5K OHM +-5% 1W
R5099	0100049	CF 220 OHM +-5% 1/8W	R701	0110367	MF 8.2K OHM +-5% 3W
R510	0100067	CF 1.2K OHM +-5% 1/8W	⚠ R702	0100083	CF 5.6K OHM +-5% 1/8W
R5102	0100049	CF 220 OHM +-5% 1/8W	⚠ R703	0150037	VR 5K OHM-B RS-8
R5103	0100059	CF 560 OHM +-5% 1/8W	R704	0100109	CF 68K OHM +-5% 1/8W
R511	0100057	CF 470 OHM +-5% 1/8W	R705	0100085	CF 6.8K OHM +-5% 1/8W
R512	0150040	VR 50K OHM-B RS-8	R706	0100033	CF 47 OHM +-5% 1/8W
R513	0100120	CF 200K OHM +-5% 1/8W	⚠ R707	0100083	CF 5.6K OHM +-5% 1/8W
R514	0100062	CF 750 OHM +-5% 1/8W	R708	0113785	CF 27K OHM +-5% 1/2W
R515	0100069	CF 1.5K OHM +-5% 1/8W	R709A	0110351	MF 1.8K OHM +-5% 3W
R516	0100073	CF 2.2K OHM +-5% 1/8W	R709B	0110351	MF 1.8K OHM +-5% 3W
R517	0100084	CF 6.2K OHM +-5% 1/8W	R710	0100075	CF 2.7K OHM +-5% 1/8W
R518	0100089	CF 10K OHM +-5% 1/8W	⚠ R711	0119505	FR 2.2 OHM +-5% 1/4W

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SYMBOL NO.	PART NO.	DESCRIPTION
⚠ R712	0119512	MF 1 OHM +-5% 1W
⚠ R713	0119514	FR 10 OHM +-5% 1/4W
R715	0113796	MF 75K OHM +-5% 1/2W
R716	0113772	CF 8.2K OHM +-5% 1/2W
R717	0110229	MF 220 OHM +-5% 2W
⚠ R718	0119505	FR 2.2 OHM +-5% 1/4W
R721	0113762	CF 3.3K OHM +-5% 1/2W
R722	0113748	CF 820 OHM+-5% 1/2W
R723	0100071	CF 1.8K OHM +-5% 1/8W
R725	0113774	CF 10K OHM +-5% 1/2W
R726	0141071	WW 4.7 OHM +-5% 6W
R732	0110145	MF 1K OHM +-5% 1W
⚠ R734	0119512	MF 1 OHM +-5% 1W
⚠ R735	0100047	CF 180 OHM +-5% 1/8W
R736	0100093	CF 15K OHM +-5% 1/8W
⚠ R737	0100080	CF 4.3K OHM +-5% 1/8W
R738	0113790	MF 43K OHM +-5% 1/2W
R739	0119632	FR 11K OHM +-1% 1/8W
R741	0114133	CF 120 OHM +-5% 1/4W
R751	0100049	CF 220 OHM +-5% 1/8W
R752	0100049	CF 220 OHM +-5% 1/8W
R753	0100049	CF 220 OHM +-5% 1/8W
R754	0100049	CF 220 OHM +-5% 1/8W
R755	0100049	CF 220 OHM +-5% 1/8W
R756	0100049	CF 220 OHM +-5% 1/8W
R757	0100049	CF 220 OHM +-5% 1/8W
R850	0100043	CF 120 OHM +-5% 1/8W
R852	0100067	CF 1.2K OHM +-5% 1/8W
R853	0151716	VR 5K OHM-B RV-8
R854	0100050	CF 240 OHM +-5% 1/8W
R856	0150001	VR 200 OHM-B
R858	0100067	CF 1.2K OHM +-5% 1/8W
R859	0151716	VR 5K OHM-B RV-8
R860	0100048	CF 200 OHM +-5% 1/8W
R862	0150001	VR 200 OHM-B
R864	0100067	CF 1.2K OHM +-5% 1/8W
R865	0151716	VR 5K OHM-B RV-8
R867	0113754	CF 1.5K OHM +-5% 1/2W
R868	0113760	CF 2.7K OHM +-5% 1/2W
R869	0113754	CF 1.5K OHM +-5% 1/2W
R877	0110271	MF 12K OHM +-5% 2W
R878	0110271	MF 12K OHM +-5% 2W
R879	0110271	MF 12K OHM +-5% 2W
R881	0100043	CF 120 OHM +-5% 1/8W
R882	0100043	CF 120 OHM +-5% 1/8W
R883	0100043	CF 120 OHM +-5% 1/8W
R913	0110271	MF 12K OHM +-5% 2W
R916	0100047	CF 180 OHM +-5% 1/8W
R918	0114205	CF 15K OHM +-5% 1/4W
R919	0100075	CF 2.7K OHM +-5% 1/8W
R920	0100075	CF 2.7K OHM +-5% 1/8W
R921	0100047	CF 180 OHM +-5% 1/8W
R922	0100091	CF 12K OHM +-5% 1/8W
R923	0110148	MF 1.3K OHM +-5% 1W
R926	0110261	MF 4.7K OHM +-5% 2W
R927	0113760	CF 2.7K OHM +-5% 1/2W
R928	0100093	CF 15K OHM +-5% 1/8W
R929	0100111	CF 82K OHM +-5% 1/8W
⚠ R930	0119505	FR 2.2 OHM +-5% 1/4W
R931	0113791	CF 47K OHM +-5% 1/2W
R932	0113791	CF 47K OHM +-5% 1/2W
R938	0114223	CF 82K OHM +-5% 1/4W
R939	0114223	CF 82K OHM +-5% 1/4W
R940	0114223	CF 82K OHM +-5% 1/4W
R941	0100039	CF 82 OHM +-5% 1/8W
R942	0110135	MF 390 OHM +-5% 1W
R943	0100017	CF 10 OHM +-5% 1/8W
⚠ R944	0113791	CF 47K OHM +-5% 1/2W
⚠ R945	0113791	CF 47K OHM +-5% 1/2W
⚠ R946	0100074	CF 2.4K OHM +-5% 1/8W
R947	0100087	CF 8.2K OHM +-5% 1/8W
R948	0100121	CF 220K OHM +-5% 1/8W
R949	0100120	CF 200K OHM +-5% 1/8W
R950	0114161	CF 1K OHM +-5% 1/4W
⚠ R951	0139015	CC 1M OHM +-10% 1/2W
⚠ R952	0141095	WW 1.5 OHM 8W
⚠ R953	0141095	WW 1.5 OHM 8W
R954	0110283	MF 39K OHM +-5% 2W
R956	0110126	MF 160 OHM +-5% 1W
R958	0100107	CF 56K OHM +-5% 1/8W
R959	0114131	CF 100 OHM +-5% 1/4W
R960	0114131	CF 100 OHM +-5% 1/4W
R961	0100098	CF 24K OHM +-5% 1/8W
R962	0113797	CF 82K OHM +-5% 1/2W
R963	0100083	CF 5.6K OHM +-5% 1/8W
R964	0100089	CF 10K OHM +-5% 1/8W
R965	0100033	CF 47 OHM +-5% 1/8W
R966	0100047	CF 180 OHM +-5% 1/8W
R968	0100089	CF 10K OHM +-5% 1/8W
R969	0100089	CF 10K OHM +-5% 1/8W
R970	0100057	CF 470 OHM +-5% 1/8W
R971	0100053	CF 330 OHM +-5% 1/8W
R972	0100105	CF 47K OHM +-5% 1/8W
R973	0100077	CF 3.3K OHM +-5% 1/8W
R974	0100105	CF 47K OHM +-5% 1/8W
R975	0100113	CF 100K OHM +-5% 1/8W
R976	0100129	CF 470K OHM +-5% 1/8W
R977	0100104	CF 43K OHM +-5% 1/8W
R978	0100047	CF 180 OHM +-5% 1/8W
R979	0100075	CF 2.7K OHM +-5% 1/8W

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SYMBOL NO.	PART NO.	DESCRIPTION
R980	0100089	CF 10K OHM +-5% 1/8W
R981	0100079	CF 3.9K OHM +-5% 1/8W
R982	0100065	CF 1K OHM +-5% 1/8W
R983	0100094	CF 16K OHM +-5% 1/8W
⚠ R984	0119690	FR 0.27 OHM+-5% 1W
R985	0100065	CF 1K OHM +-5% 1/8W
R986	0100038	CF 75 OHM +-5% 1/8W
R987	0150034	VR 500 OHM-B RS-8
R988	0100041	CF 100 OHM +-5% 1/8W
R989	0113791	CF 47K OHM +-5% 1/2W
R990	0110339	MF 560 OHM +-5% 3W
R991	0110242	MF 750 OHM +-5% 2W
R992	0110123	MF 120 OHM +-5% 1W
R993	0100055	CF 390 OHM +-5% 1/8W
R994	0100061	CF 680 OHM +-5% 1/8W
R995	0114147	CF 470 OHM +-5% 1/4W
R996	0113754	CF 1.5K OHM +-5% 1/2W
⚠ R997	0190199	WW 0.5 OHM
⚠ R998	0190198	WW 0.3 OHM +- 10% RG1P
ICs		
IC201	2368282	IC M51354AP
IC501	2365062	IC HA11436A
⚠ IC701	2364181	IC HA11423
IC702	2363191	IC HC14066BP
⚠ IC951	2366721	IC UPC1394C
⚠ IC952	2368671	IC STA8012
I0001	2362492	IC HD43019A
I0101	2366631	IC AN5020
I0201	2368292	IC MN14414F
I0202	2368451	IC MJ1228
I0203	2365411	IC UPC339C/TA75339P
I0204	2366621	IC LA7910
I0205	2366571	IC MIL217A
I3001	2368271	IC M51321P
I4001	2366392	IC AN5836
I5001	2367941	IC HC7407P
I5002	2368721	IC AN5352
TRANSISTORS		
Q0001	2323352	TR 2SB642R/S
Q0002	2321984	TR 2SC2060(R)
Q0101	0573480	TR 2SC458B
Q0201	2324082	TR 2SK105(F)
Q0202	2320663	TR 2SC1213AC
Q0204	2320645	TR 2SC1162W (C)/(D)
Q0205	2320644	TR 2SC1213D
Q0208	2322191	TR 2SC1740(R)

SYMBOL NO.	PART NO.	DESCRIPTION
Q0211	2320637	TR 2SA673C/D
Q0212	2320637	TR 2SA673C/D
Q0214	0573480	TR 2SC458B
Q0215	0573480	TR 2SC458B
Q0216	0573480	TR 2SC458B
Q0217	0573480	TR 2SC458B
Q0218	2322191	TR 2SC1740(R)
Q0219	2320637	TR 2SA673C/D
Q0220	2322191	TR 2SC1740(R)
Q0221	2320644	TR 2SC1213D
Q0222	2320637	TR 2SA673C/D
Q0226	0573480	TR 2SC458B
Q071	2320143	TR 2SC717TM
Q101	2321984	TR 2SC2060(R)
Q201	0573480	TR 2SC458B
Q223	2320637	TR 2SA673C/D
Q3001	2320644	TR 2SC1213D
Q3002	2321351	TR 2SA836/844 D/E
Q3003	2321351	TR 2SA836/844 D/E
Q3004	2320595	TR 2SC458D
Q3005	0573480	TR 2SC458B
Q3006	0573480	TR 2SC458B
Q305	0573480	TR 2SC458B
Q306	2320637	TR 2SA673C/D
Q307	0573480	TR 2SC458B
Q308	0573480	TR 2SC458B
Q351	0573480	TR 2SC458B
Q352	2321351	TR 2SA836/844 D/E
Q353	2320595	TR 2SC458D
Q354	0573480	TR 2SC458B
Q355	0573480	TR 2SC458B
Q356	2321351	TR 2SA836/844 D/E
Q357	2320595	TR 2SC458D
Q358	0573480	TR 2SC458B
Q4001	0573480	TR 2SC458B
Q4002	0573480	TR 2SC458B
Q4003	2320644	TR 2SC1213D
Q4004	2320644	TR 2SC1213D
Q4005	2320644	TR 2SC1213D
Q4008	2321351	TR 2SA836/844 D/E
Q4009	2320595	TR 2SC458D
Q401	0573480	TR 2SC458B
Q4010	2323432	TR 2SC1983R/O/Y
Q4011	2323432	TR 2SC1983R/O/Y
Q4012	0573480	TR 2SC458B
Q420	2321351	TR 2SA836/844 D/E
Q421	0573480	TR 2SC458B
Q423	2323432	TR 2SC1983R/O/Y
Q424	2323432	TR 2SC1983R/O/Y
Q5001	0573480	TR 2SC458B

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SYMBOL NO.	PART NO.	DESCRIPTION
Q5002	0573480	TR 2SC458B
Q5003	0573480	TR 2SC458B
Q5004	0573480	TR 2SC458B
Q5005	2321984	TR 2SC2060(R)
Q5006	0573480	TR 2SC458B
Q5007	0573480	TR 2SC458B
Q5014	2320637	TR 2SA673C/D
Q5016	0573480	TR 2SC458B
Q5018	0573480	TR 2SC458B
Q551	0573480	TR 2SC458B
Q601	2324471	TR 2SD1459Q/R
Q602	2324471	TR 2SD1459Q/R
⚠ Q701	2324322	TR 2SC2271/2SC2611-05
Q702	2324412	TR 2SD1455
Q851	2321221	TR 2SC1514
Q852	2321221	TR 2SC1514
Q853	2321221	TR 2SC1514
⚠ Q951	2324414	TR 2SD1455
⚠ Q952	2323541	TR 2SC1756HP
Q954	0573480	TR 2SC458B
Q955	0573480	TR 2SC458B
⚠ Q956	2320681	TR 2SA673A B/C
Q958	2323771	TR PN103
Q959	2320631	TR 2SA673B/C
DIODES		
D0001	2332891	DI SE303A
D0002	2332891	DI SE303A
D0101	2332431	DI PN302
D0102	2331351	DI 1S2076/1S2473H
D0201	2331351	DI 1S2076/1S2473H
D0202	2331351	DI 1S2076/1S2473H
D0203	2331351	DI 1S2076/1S2473H
D0204	2331351	DI 1S2076/1S2473H
D0206	2331351	DI 1S2076/1S2473H
D0207	2331351	DI 1S2076/1S2473H
D0208	2331351	DI 1S2076/1S2473H
D0209	2331351	DI 1S2076/1S2473H
D0210	2331351	DI 1S2076/1S2473H
D0211	2331351	DI 1S2076/1S2473H
D0212	2331351	DI 1S2076/1S2473H
D0213	2331351	DI 1S2076/1S2473H
D0214	2331351	DI 1S2076/1S2473H
D0215	2331351	DI 1S2076/1S2473H
D0217	2331351	DI 1S2076/1S2473H
D0224	2331351	DI 1S2076/1S2473H
D0225	2331351	DI 1S2076/1S2473H
D0228	2331351	DI 1S2076/1S2473H
D0232	2331351	DI 1S2076/1S2473H

SYMBOL NO.	PART NO.	DESCRIPTION
D0233	2331351	DI 1S2076/1S2473H
D0234	2331351	DI 1S2076/1S2473H
D0235	2331351	DI 1S2076/1S2473H
D0236	2331201	DI WO-6B
D0237	2331351	DI 1S2076/1S2473H
D0240	2331351	DI 1S2076/1S2473H
D0241	2331351	DI 1S2076/1S2473H
D0242	2331351	DI 1S2076/1S2473H
D0243	2331351	DI 1S2076/1S2473H
D0244	2331351	DI 1S2076/1S2473H
D0247	2331351	DI 1S2076/1S2473H
D0251	2333791	LED SLR-34UR12
D3001	2331351	DI 1S2076/1S2473H
D3002	2331351	DI 1S2076/1S2473H
D3003	2331351	DI 1S2076/1S2473H
D3004	2331351	DI 1S2076/1S2473H
D3005	2331351	DI 1S2076/1S2473H
D3006	2331351	DI 1S2076/1S2473H
D3007	2331351	DI 1S2076/1S2473H
D3008	2331351	DI 1S2076/1S2473H
D3009	2331351	DI 1S2076/1S2473H
D301	2331351	DI 1S2076/1S2473H
D3010	2331351	DI 1S2076/1S2473H
D3011	2331351	DI 1S2076/1S2473H
D3012	2331351	DI 1S2076/1S2473H
D302	2331351	DI 1S2076/1S2473H
D303	2331351	DI 1S2076/1S2473H
D304	2331351	DI 1S2076/1S2473H
D351	2331351	DI 1S2076/1S2473H
D352	2331351	DI 1S2076/1S2473H
D353	2331351	DI 1S2076/1S2473H
D355	2331351	DI 1S2076/1S2473H
D4001	2331351	DI 1S2076/1S2473H
D4002	2331351	DI 1S2076/1S2473H
D4003	2331351	DI 1S2076/1S2473H
D4004	2331351	DI 1S2076/1S2473H
D4005	2331351	DI 1S2076/1S2473H
D4006	2331351	DI 1S2076/1S2473H
D4007	2331351	DI 1S2076/1S2473H
D4008	2331351	DI 1S2076/1S2473H
D4009	2331351	DI 1S2076/1S2473H
D4010	2331351	DI 1S2076/1S2473H
D4011	2331351	DI 1S2076/1S2473H
D4012	2331351	DI 1S2076/1S2473H
D4013	2331201	DI WO-6B
D4014	2331351	DI 1S2076/1S2473H
D4015	2331351	DI 1S2076/1S2473H
D420	2331201	DI WO-6B
D5001	2331351	DI 1S2076/1S2473H
D5002	2331351	DI 1S2076/1S2473H

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SYMBOL NO.	PART NO.	DESCRIPTION
D5003	2331351	DI 1S2076/1S2473H
D5004	2331351	DI 1S2076/1S2473H
D5005	2331351	DI 1S2076/1S2473H
D5006	2331351	DI 1S2076/1S2473H
D5007	2331351	DI 1S2076/1S2473H
D5008	2331351	DI 1S2076/1S2473H
D5009	2331351	DI 1S2076/1S2473H
D5010	2331351	DI 1S2076/1S2473H
D5011	2331351	DI 1S2076/1S2473H
D5012	2331351	DI 1S2076/1S2473H
D5013	2331351	DI 1S2076/1S2473H
D5014	2331351	DI 1S2076/1S2473H
D5015	2331351	DI 1S2076/1S2473H
D5016	2331351	DI 1S2076/1S2473H
D5017	2331351	DI 1S2076/1S2473H
D5018	2331351	DI 1S2076/1S2473H
D5019	2331351	DI 1S2076/1S2473H
D5020	2331351	DI 1S2076/1S2473H
D5021	2331351	DI 1S2076/1S2473H
D5023	2331351	DI 1S2076/1S2473H
D5024	2331351	DI 1S2076/1S2473H
D5025	2331351	DI 1S2076/1S2473H
D5026	2331351	DI 1S2076/1S2473H
D5027	2331351	DI 1S2076/1S2473H
D601	2330351	DI 1S2076
D602	2330351	DI 1S2076
D701	2332251	DI RH1S
D702	2332851	DI EH1Z
D703	2332141	DI RH1Z
D704	2332851	DI EH1Z
⚠ D705	2332851	DI EH1Z
D706	2330352	DI 1S2076A
⚠ D708	2331351	DI 1S2076/1S2473H
⚠ D903	2331201	DI WO-6B
D950	2331351	DI 1S2076/1S2473H
D952	2332251	DI RH1S
⚠ D953	2333003	DI RU2AM
⚠ D954	2332242	DI RF1B
⚠ D955	2333003	DI RU2AM
D956	2331201	DI WO-6B
D957	2330352	DI 1S2076A
⚠ D960	2331481	DI V06CS/SIB01-02
D961	2331351	DI 1S2076/1S2473H
D962	2334011	DI SE304
D963	2331351	DI 1S2076/1S2473H
D964	2331351	DI 1S2076/1S2473H
⚠ D965	2330551	DI V09C
⚠ D969	2330551	DI V09C
⚠ D970	2330551	DI V09C
⚠ D971	2330551	DI V09C
⚠ D972	2333232	ZD RM10A
⚠ D973	2333232	ZD RM10A
⚠ D974	2333232	ZD RM10A
⚠ D975	2333232	ZD RM10A
⚠ D977	2330551	DI V09C
ZD101	2331495	ZD RD5.6EB
ZD201	2331001	ZD HZ6A
ZD301	2331161	ZD HZ11(A)/(B)/(C)
ZD302	2331161	ZD HZ11(A)/(B)/(C)
ZD501	2331154	ZD HZ12(A)/(B)/(C)
ZD502	2331154	ZD HZ12(A)/(B)/(C)
ZD503	2331154	ZD HZ12(A)/(B)/(C)
ZD701	2331161	ZD HZ11(A)/(B)/(C)
ZD702	2334303	ZD RD30EB2
⚠ ZD703	2335461	ZD HZ24L-2
ZD704	2331154	ZD HZ12(A)/(B)/(C)
ZD741	2331154	ZD HZ12(A)/(B)/(C)
ZD742	2331161	ZD HZ11(A)/(B)/(C)
ZD743	2331161	ZD HZ11(A)/(B)/(C)
ZD951	2334142	DI RD6.2EB1
⚠ ZD952	2331001	ZD HZ6A
⚠ ZD953	2334122	ZD RD5.1EB1
⚠ ZD954	2335461	ZD HZ24L-2
ZD960	2334052	ZD RD2.7EB1
Z0201	2334312	DI RD33EB1
Z0202	2331807	ZD HZ6(C)1
Z0203	2331621	ZD HZ9(A)1
Z0205	2334122	ZD RD5.1EB1
Z0208	2330633	ZD HZ7(C)
Z0212	2331497	ZD RD6.2EB
Z0214	2331154	ZD HZ12(A)/(B)/(C)
Z3001	2331161	ZD HZ11(A)/(B)/(C)
Z3002	2331161	ZD HZ11(A)/(B)/(C)
Z4001	2331161	ZD HZ11(A)/(B)/(C)
Z4002	2331161	ZD HZ11(A)/(B)/(C)
Z4003	2331161	ZD HZ11(A)/(B)/(C)
Z4004	2331161	ZD HZ11(A)/(B)/(C)
Z4005	2332483	ZD RD2.7EB1
Z4006	2332483	ZD RD2.7EB1
Z5001	2331807	ZD HZ6(C)1
Z5005	2331161	ZD HZ11(A)/(B)/(C)
Z5006	2331161	ZD HZ11(A)/(B)/(C)
Z5007	2331161	ZD HZ11(A)/(B)/(C)
Z5008	2331161	ZD HZ11(A)/(B)/(C)
Z5009	2331161	ZD HZ11(A)/(B)/(C)
Z5010	2331161	ZD HZ11(A)/(B)/(C)
Z5011	2331161	ZD HZ11(A)/(B)/(C)
Z5012	2331161	ZD HZ11(A)/(B)/(C)
Z5013	2331161	ZD HZ11(A)/(B)/(C)
Z5014	2331161	ZD HZ11(A)/(B)/(C)

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SYMBOL NO.	PART NO.	DESCRIPTION
Z5015	2331161	ZD HZ11(A)/(B)/(C)
		THERMISTORS
⚠ TH951	2340541	TH 160Y4301
		COILS
L0101	2122253	LA AXIAL COIL
L0201	2121706	PEAKING COIL 10 MI +-10%
L0208	2122234	LA AXIAL COIL
L0210	2120482	FILTER COIL 100MH +-10%
L0212	2121706	PEAKING COIL 100MI +-10%
L0213	2121706	PEAKING COIL 100MI +-10%
L0214	2121706	PEAKING COIL 100MI +-10%
L0217	2122239	LA AXIAL COIL 10UH
L071	2141776	M7-D TYPE COIL
L072	2122253	LA AXIAL COIL
L101	2120482	FILTER COIL 100MH +-10%
L202	2142661	S10-H MOLD IFT
L203	2122232	LA AXIAL COIL 2.7UH
L204	2142015	G TYPE MOLD IFT
L205	2142015	G TYPE MOLD IFT
L206	2122251	LA AXIAL COIL 68 MICROH
L207	2122242	LA AXIAL COIL 15UH
L208	2122241	LA AXIAL COIL 12UH
L209	2122253	LA AXIAL COIL
L210	2122253	LA AXIAL COIL
L3001	2122253	LA AXIAL COIL
L3002	2122253	LA AXIAL COIL
L3003	2120482	FILTER COIL 100MH +-10%
L304	2122248	LA AXIAL COIL 47 MICROH
L305	2122248	LA AXIAL COIL 47 MICROH
L306	2122249	LA AXIAL COIL 56UH
L351	2141143	1H DL COIL
L352	2121706	PEAKING COIL 100MI +-10%
L353	2141148	1H DL COIL
L401	2122251	LA AXIAL COIL 68 MICROH
L402	2122253	LA AXIAL COIL
L5001	2122253	LA AXIAL COIL
L5002	2120482	FILTER COIL 100MH +-10%
L501	2122241	LA AXIAL COIL 12UH
L502	2122241	LA AXIAL COIL 12UH
L503	2122241	LA AXIAL COIL 12UH
L701	2122093	FILTER COIL
⚠ L703	2160891	HORIZONTAL LINEARITY COIL
⚠ L706	2122095	FILTER COIL 27UH
L708	2120486	FILTER COIL 4700MI
L851	2122254	LA AXIAL COIL 120 UH
⚠ L951	2122741	FILTER COIL
L954	2120482	FILTER COIL 100MH +-10%
L955	2120333	FILTER COIL
L956	2120482	FILTER COIL 100MH +-10%
L957	2120481	FILTER COIL
L958	2120481	FILTER COIL
L959	2122121	COIL
L961	2120482	FILTER COIL 100MH +-10%
L962	2120482	FILTER COIL 100MH +-10%
L963	2120482	FILTER COIL 100MH +-10%
		TRANSFORMERS
T0101	2162012	COIL 38KHZ
T501	2141533	BAND PASS TRANSFORMER
⚠ T701	2433841	FLYBACK TRANSFORMER
T702	2260021	TRANS HORIZONTAL DRIVE
⚠ T703	2270186	PCT-H TRANSFORMER
⚠ T951	2271442	SWITCHING TRANSFORMER
⚠ T952	2271221	DRIVE TRANSFORMER
⚠ T953	2271213	SWITCHING TRANSFORMER
		COMPOUND COMPONENTS
CP201	2300073	SAW FILTER HW2063
MF201	2142241	CERAMIC FILTER 4.5MHZ
MF401	2142601	CERAMIC FILTER 4.5MHZ
MF402	2790881	CERAMIC FILTER
M0001	2790841	CERAMIC FILTER CSB455EB
		MISCELLANEOUS
DL351	2790901	1H DELAY LINE
DL352	2163292	DELAY LINE
RF	2664722	COAXIAL CABLE WITH PIN PLUG
⚠ RL901	2640282	POWER RELAY
SG851	2340037	SPARK GAP
⚠ SG951	2340037	SPARK GAP
⚠ SG952	2340037	SPARK GAP
SP451	2412071	SPEAKER 100X100MM
SP452	2412071	SPEAKER 100X100MM
S0201	2631722	KEY SWITCH
S0202	2631722	KEY SWITCH
S0203	2631722	KEY SWITCH
S0204	2631722	KEY SWITCH
S0205	2631722	KEY SWITCH
S0206	2631722	KEY SWITCH
S0207	2631722	KEY SWITCH
S0208	2620671	SLIDE SWITCH
S0209	2631722	KEY SWITCH
S0211	2631722	KEY SWITCH

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	DESCRIPTION
S0212	2631722	KEY SWITCH
S0222	2631722	KEY SWITCH
S0223	2631722	KEY SWITCH
S0224	2620781	SLIDE SWITCH
S151	2630771	PUSH SWITCH
S4001	2620163	SLIDE SWITCH
X0201	2785302	CRYSTAL 4.5MHZ
X501	2790441	CRYSTAL
⚠ V1	2354502	CPT A63JGC01X
⚠	2425441	TUNER ET-449
⚠	2442161	DEFLECTION YOKE
	2582552	REMOTE CONTROL TRANSMITTER
	2659471	INSULATOR FOR FOCUS LEAD
	2660413	PLUG
	2661752	3P PIN PLUG WITH BASE
	2661753	PLUG
	2720221	FUSE HOLDER
	2720586	FUSE 3A
	2742302	POWER CORD
	2771461	MAGNET
	2771831	C-F MAGNET
	2771892	FERRITE BEADS CORE 004
	2781282	BEAD BAND
	2781693	WASHER YD-1C
	2784331	CPT SOCKET FOCUS COVER
	2786281	MICA SHEET
	2786301	TRS SHEET
	2950301	CPT SOCKET
	2981232	IN/OUT TERMINAL BOARD
	3116805	CABINET ASS'Y
	3191095	FRONT GLASS (HCPA)
	3262442	KNOB-APS
	3265801	SELECT BUTTON
	3330941	EARTH SPRING
	3719342	CANOE RIVET
	3727972	HOLDER-AC LINE CORD
	3738321	PLASTIC FOOT ASS
	3763751	SK BINDER
	3771501	KNOB PRESET
	3772201	AC CORD HOLDER
	3778101	CORD CASE (HTT)
	3778213	BATTERY LID (HTT)
	3778221	REMOTE CONTROL FILTER
	3779031	KNOB-CHANNEL (HTT)
	3779041	VOLUME KNOB (HTT)
	3780091	PWB SPACER 81X
	3781032	DOOR-S
	3781141	R/C CASE(B) (HTT)

SYMBOL NO.	PART NO.	DESCRIPTION
	3781274	SIDE SPEAKER PANEL
	4137974	4X12 TAPPING SCREW WITH WASHER
	4137975	4X16 SELF-TAPPING SCREW WITH FLANGE
	4159411	3X8 KNURL TAPPING SCREW
	4159421	M3X8 TAPPING SCREW
	4159423	M3X12 SCREW FOR RC PWB W/WASHER
	4159424	3X10 SCREW
	4159425	3X16 TAPPING SCREW
	4260501	GLASS HOLDER
	4263111	SPRING-SPEAKER PANEL
	4230881	BATTERY TERMINAL (B-2)
	4260891	BATTERY TERMINAL (C-2)
	4518374	SCREW-CPT
	4518742	M2.3X12 PAN HEAD SCREW WITH WASHER
	4518751	M2.3 NUT
	4521451	M2.6 BIND SCREW
	4614001	WEDGE
	4616791	SWITCH GUM
	4770772	3 NUT

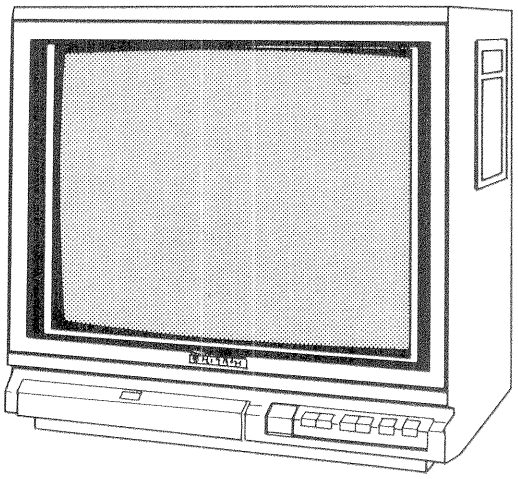
Printed in Japan YS-N (F)

CT3000M YK No.989E YOKOHAMA
NTSC-SYSTEM NP83X Chassis

HITACHI
SERVICE MANUAL

YK | No.940E

CT3000S
CT3000W



This service manual shows only essential items.
Our complete service manual including "alignment procedure", and "technical information" are issued by manual No. 895.

CAUTION: Before servicing this chassis, it is important that the service technician read the "Safety Precaution" and "Product Safety Notices" in this Service Manual.

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SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

COMPONENT COLOR TELEVISION

December 1983 **YOKOHAMA WORKS**

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis or picture tube.

WARNING: Since the chassis of this receiver is connected to one side of AC power supply during operation, whenever the receiver is plugged in, service should not be attempted by anyone unfamiliar with the precautions necessary when working on this type of receiver.

The following precautions should be observed:

1. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep picture tube away from the body while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on a "HOT" chassis receiver.
3. When replacing a chassis in the receiver, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment cover-shields, isolation resistor-capacitor, etc.
4. When service is required, observe the original lead dress. Extra precaution should be taken to assure correct lead dress in the high voltage circuitry area.
5. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacture's. Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the receiver by the manufacturer has become defective, or inadvertently defeated during servicing.

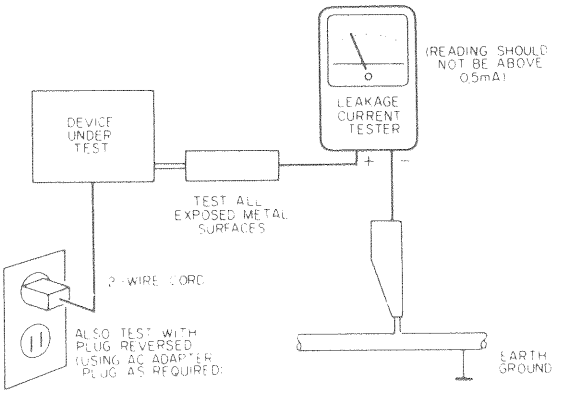
Therefore, the following checks should be performed for the continued protection of the customer and service technician.

Leakage Current Cold Check

With the AC plug removed from the 120V AC 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC 500V), connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3MΩ and a maximum resistor reading of 5MΩ. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a 120V AC 60Hz outlet (do not use an isolation transformer for this check). Turn the AC power switch on. Using a "leakage Current Tester (Simpson Model 229 equivalent)", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly any exposed metal part having a return path to the chassis, to a known earth ground (water pipe, conduit, etc.). Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE RECEIVER TO THE CUSTOMER.

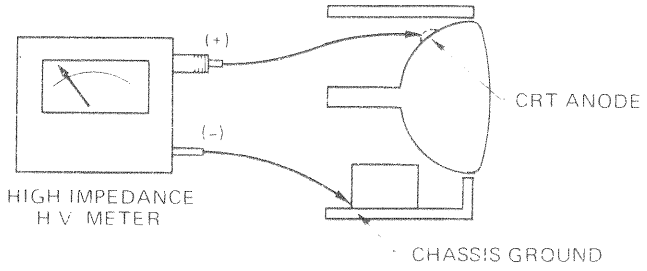
High Voltage

This receiver is provided with a hold down circuit for clearly indicating that voltage has increased in excess of a predetermined value. Comply with all notes described in this Service Manual regarding this hold down circuit when servicing, so that this hold down circuit may correctly be operated.

Serviceman warning

With minimum Brightness and Picture, operating high voltage in this receiver is lower than 32.0 kV. In case any component having influence on high voltage is replaced, confirm that high voltage with minimum Brightness and Picture is lower than 32.0 KV. To measure H.V. use a high impedance H.V. meter. Connect (-) to chassis earth and (+) to the CRT anode button. (See the following connection diagram).

NOTE: Turn power switch off without fail before the connection with Anode button is made.



X-radiation

TUBE: The primary source of X radiation in this receiver is the picture tube. The tube utilized for the above mentioned function in this chassis is specially constructed to limit X radiation emissions.

For continued X radiation protection, the replacement tube must be the same type as the orignal, HITACHI approved type.

When trouble shooting and making test measurements in a receiver with a problem of excessive high voltage, avoid being unnecessarily close to the picture tube and the high voltage component.

Do not operate the chassis longer than is necessary to locate the cause excessive voltage.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receiver have special safety related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characterisitcs are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, X-radiation, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

TECHNICAL SPECIFICATIONS

ANTENNA INPUT IMPEDANCE	300Ω, 75Ω
CHANNEL COVERAGE	
VHF	2 ~ 13
UHF	14 ~ 83
CATV	A-5 ~ A-1
	A ~ W
	W + 1 ~ W + 28
CHANNEL INDICATOR	DIGITAL/ON SCREEN
INTERMEDIATE FREQUENCY	
Picture I-F Carrier	45.75 MHz
Sound I-F Carrier	41.25 MHz
Sound I-F	4.5 MHz
POWER INPUT	AC120V, 60 Hz
POWER RATING	164W
CONVERGENCE	Self convergence
FOCUS	Electrostatic
SOUND OUTPUT	2.5W x 2
DIMENSIONS	
W	64.8 cm
H	57.2 cm
D	53.3 cm
WEIGHT	Appr. 40.0 Kg

TECHNICAL CAUTIONS

[CHECK OF HIGH VOLTAGE HOLD DOWN CIRCUIT]

Checking of the high voltage hold down circuit operation

1. Turn the switch of the set OFF.
2. Connect a high voltage voltmeter between the CRT anode and the chassis ground (K3) as shown in Fig. 1.
3. Connect Equipment – A as shown in Fig. 2. Be sure that the control knob of Equipment – A is rotated fully counterclockwise. (Registance value: max.)
4. Set the AC input voltage to 120V±3V. Turn the switch of the set ON.
5. Set the Brightness and Picture controls to maximum.
6. Slowly rotate the control knob of Equipment – A clockwise and confirm that picture on the screen disappears at the indication of high voltage voltmeter less than 32.0kV.
7. Turn the set OFF, and disconnect Equipment – A and high voltage voltmeter.

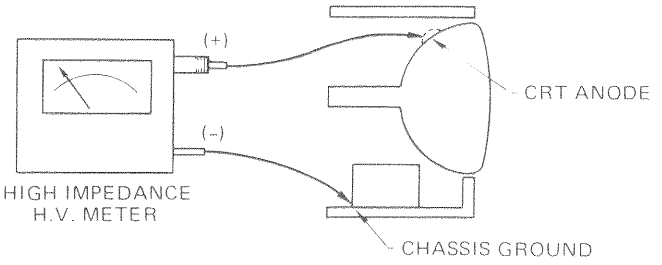


Fig. 1 Connection of H.V. Meter

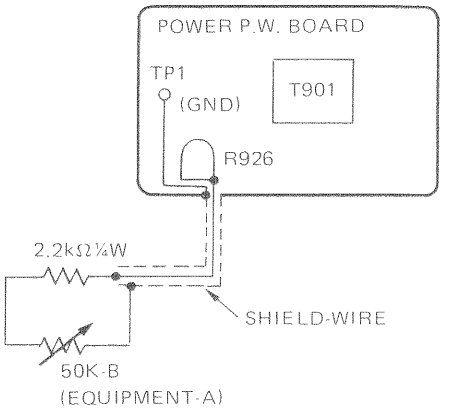
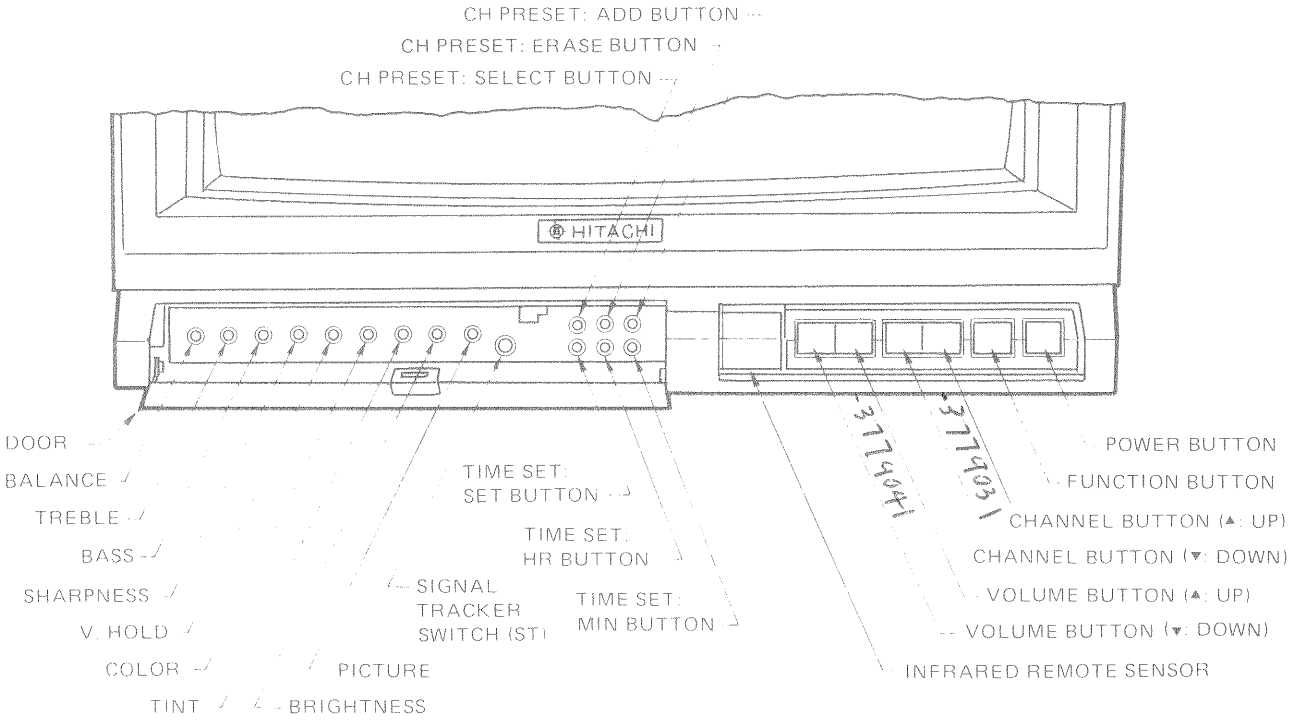
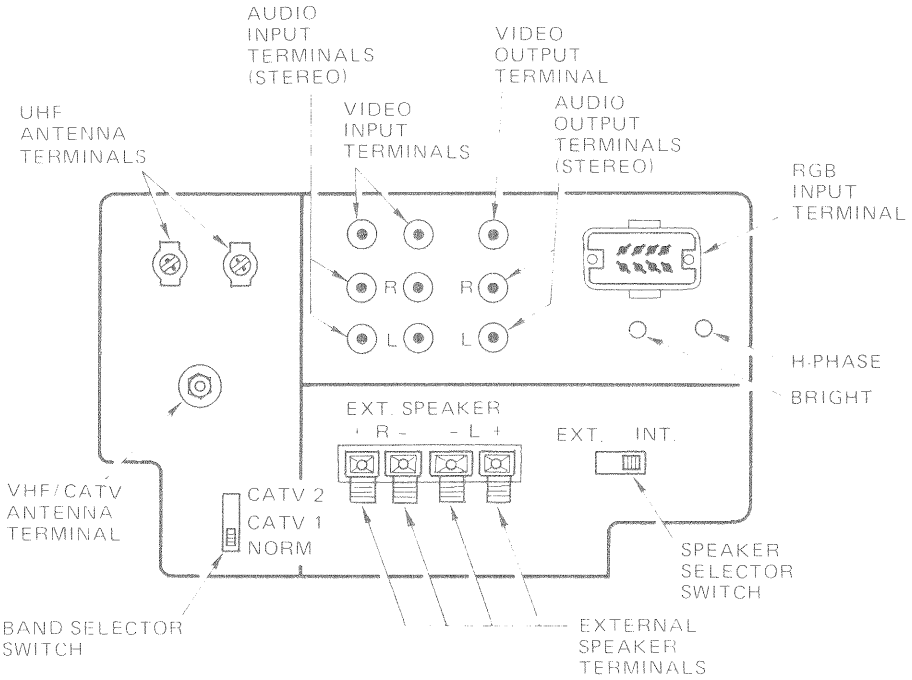


Fig. 2

CONTROLS



BACK PANNEL TERMINALS



OPERATING SUMMARY

1. CHANNEL PRESETING

A special programming circuit in the tuning system allows you to preset into the receiver's memory those channels you prefer to watch. Then, by pressing the CHANNEL BUTTON UP side (▲) or DOWN side (▼), the tuner will advance directly to the next preset channel ..... automatically skipping the unwanted ones. VHF 2-13 channels have been preset at the factory. To erase unwanted channels from the memory or to additional channels available in your area, follow the instructions below in the exact order shown.

1. ELIMINATING UNWANTED CHANNELS –

(CHANNEL BUTTON) (SELECT BUTTON)
(ERASE BUTTON)

(1) Press the CHANNEL BUTTON (▲: UP or ▼: DOWN) to select the unwanted channel.
(2) Press the ERASE BUTTON while pressing the SELECT BUTTON in the door, and the channel is erased from the memory. When you press the SELECT BUTTON at this time, the time indication at the lower right side on the screen changes to "P" and "P" disappears by pressing the ERASE BUTTON. This means that the memory storage mode (indicated by "P") has changed to the memory erase mode ("P" disappears). (See Fig. 3 and Fig. 4)
(3) Repeat item 1 and 2 to erase the memory of other unwanted channels.

2. ADDING DESIRED CHANNELS –

(CHANNEL BUTTON) (SELECT BUTTON)
(ADD BUTTON)

(1) Press the CHANNEL BUTTON (▲: UP or ▼: DOWN) to tune to the desired channel. When you tune the channel using CHANNEL BUTTON, press the CHANNEL BUTTON while pressing the SELECT BUTTON. At this time, the time indication disappears and "P" is not also displayed.
(2) Press the ADD BUTTON while pressing the SELECT BUTTON, and the channel is stored in memory. "P" is indicated at this time. (See Fig. 3 and Fig. 4)
(3) Repeat item 1 and 2 to store other channels in memory.

Note: 1. When all channels have been erase, channels cannot be changed by pressing the CHANNEL BUTTON UP (▲) or DOWN (▼). In this case, press the CHANNEL BUTTON while pressing the SELECT BUTTON.
2. The FUNCTION BUTTON (for selecting external VCR, Video Disc Player or Personal Computer) can not be stored in memory.

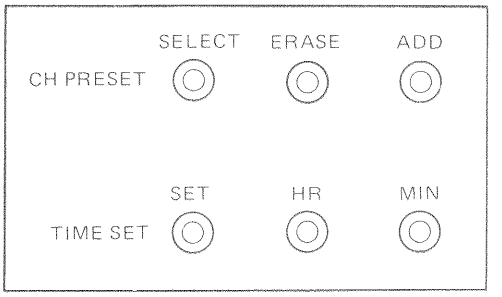
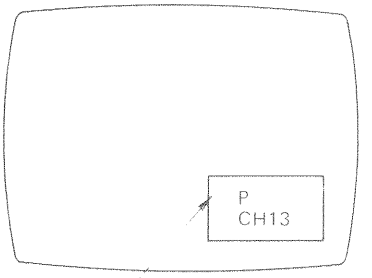


Fig. 3



Memory indicator
"P" indicated . . . . . Adding
"P" not indicated . . . Eliminating

Fig. 4

2. TIME SETTING

Your TV is equipped with a clock circuit and can display the time for your convenience. To set the correct time on your TV, operate as follows.

1. SETTING THE HOUR –

(SET BUTTON) (HR BUTTON)

Push the HR BUTTON while pressing the SET BUTTON until the time display on the screen shows the correct hour.

2. SETTING THE MINUTE –

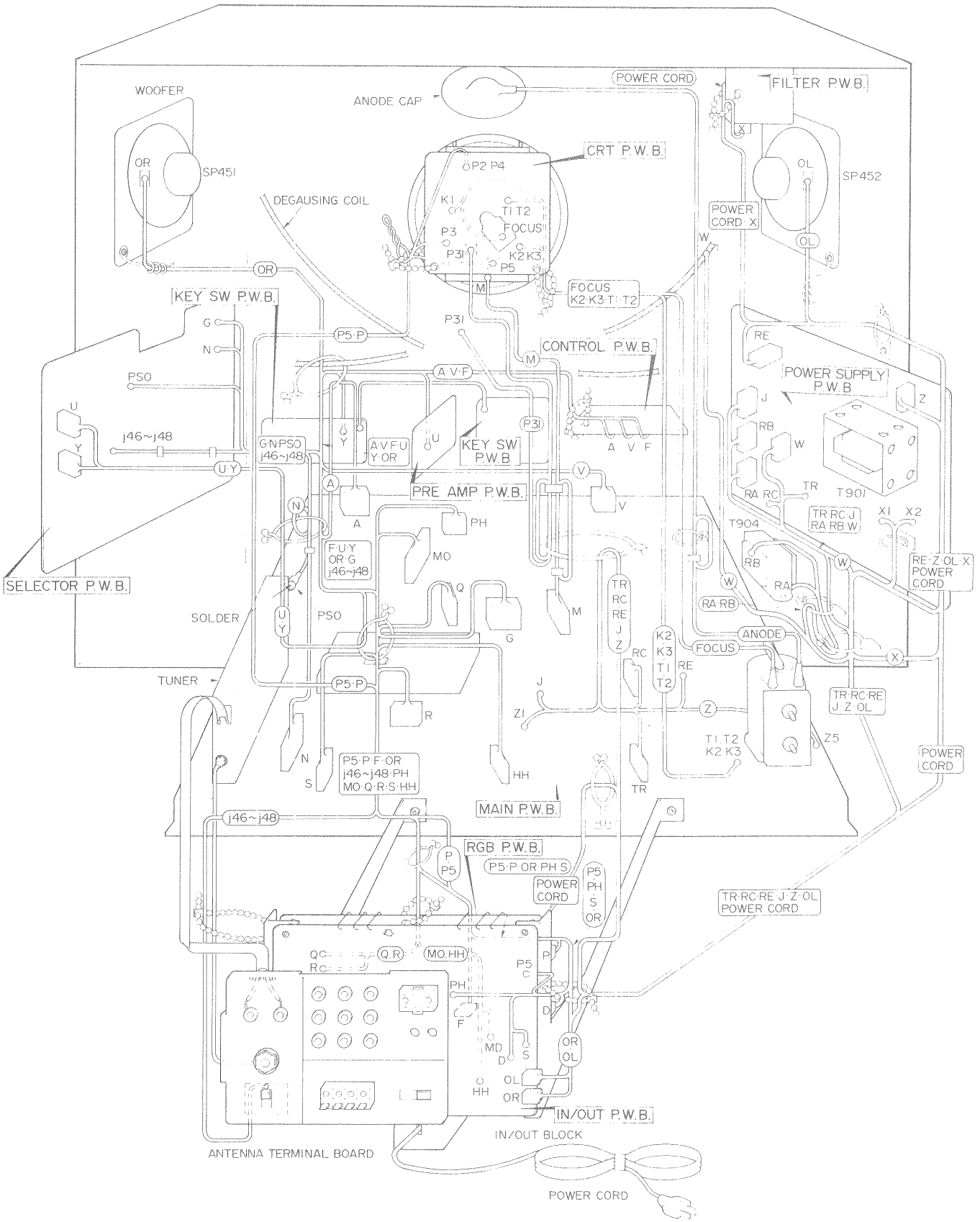
(SET BUTTON) (MIN BUTTON)

Push the MIN BUTTON while pressing the SET BUTTON until the time display on the screen shows the correct minute.

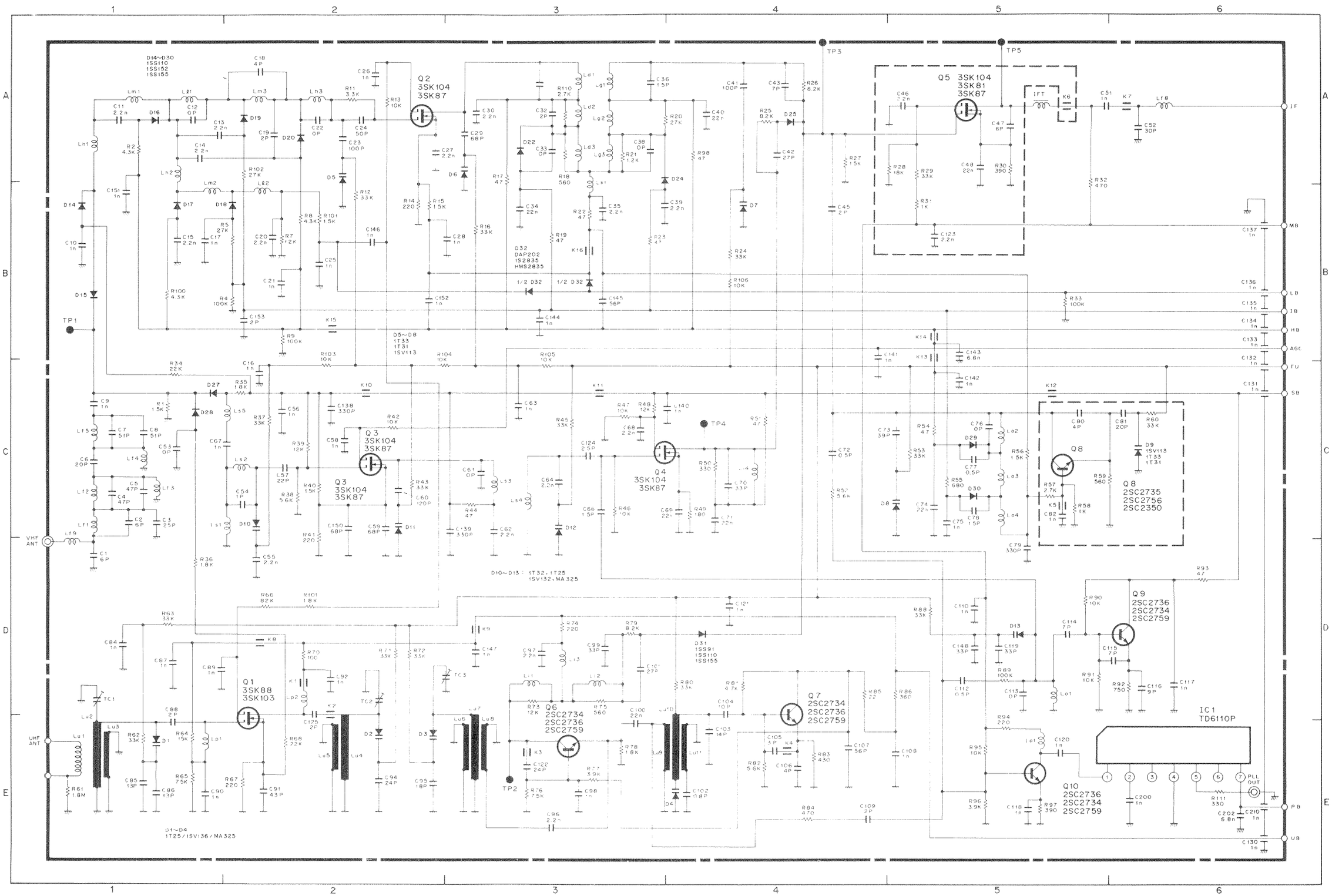
* When pressing the SET BUTTON, the time is displayed at the right lower side of the screen automatically.
* When you have finished time adjustment, the time display disappears after approx. 4 seconds.
* The clock starts operating just after the SET BUTTON is released. When you release the SET BUTTON simultaneously with a time signal, the clock starts from 0 second.

Note: 1. If the time display does not appear on the screen the power to the receiver has been interrupted (power failure, the receiver has been unplugged) and the clock must be reset.
2. When the power cord is unpluged, the clock is stopped. It is better that the power cord is not unpluged except you are going out for along time or not using the set for a period of time.
3. When you use the set in an area with a power frequency other than 60 Hz, the time display will not operate correctly.

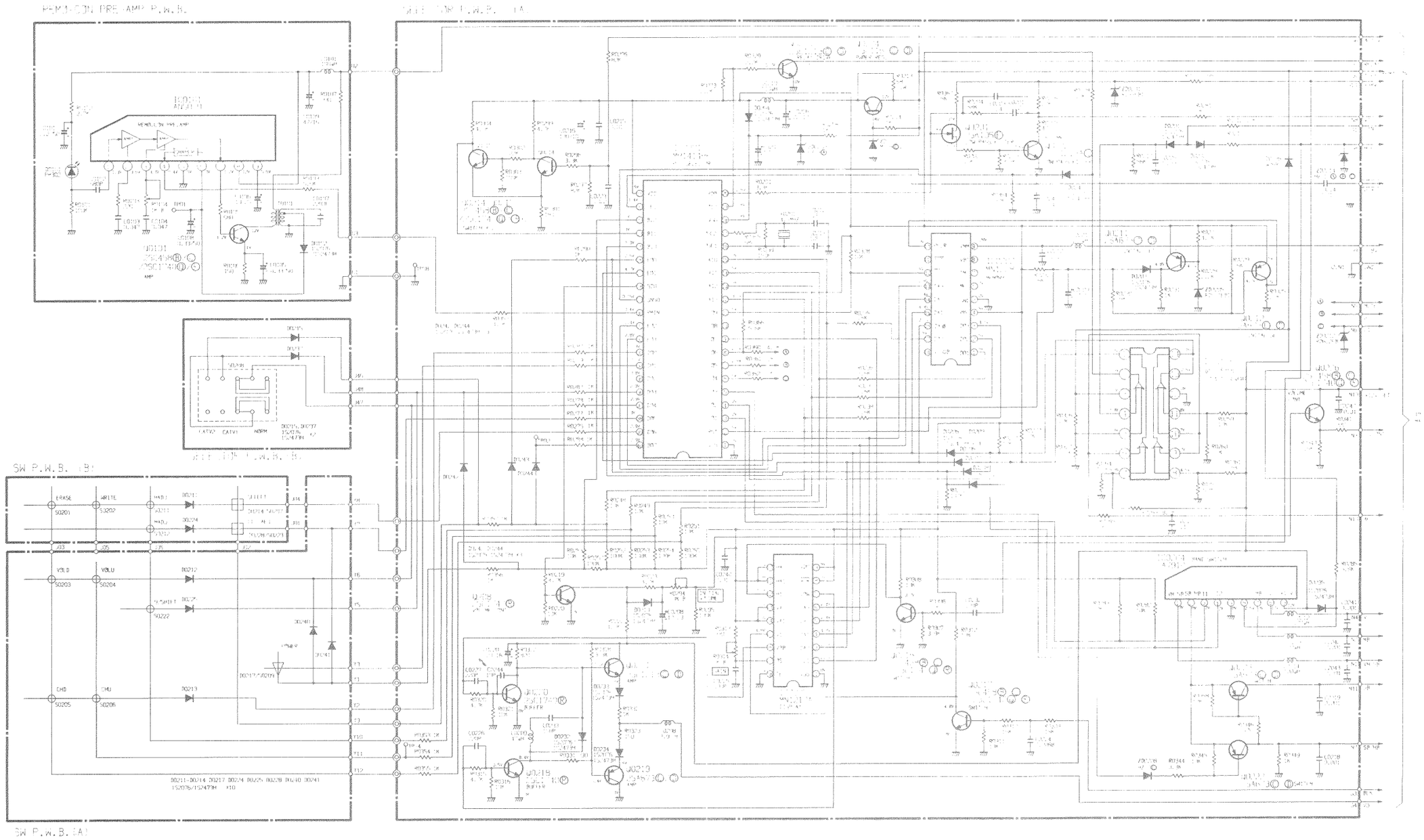
WIRING DIAGRAM



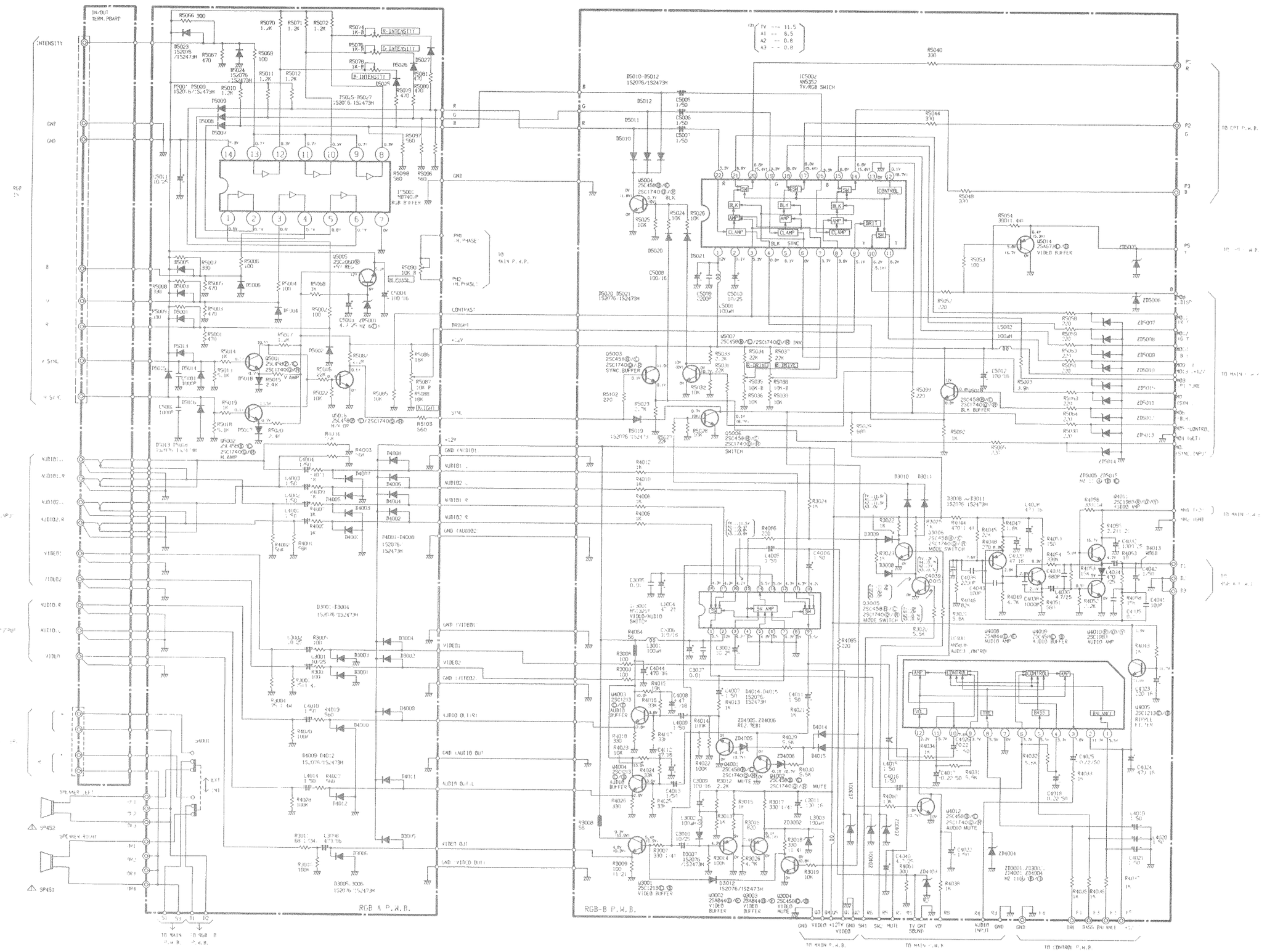
TUNER CIRCUIT DIAGRAM (ET-449)



PROGRAM SELECTOR CIRCUIT (CT3000S/CT3000W)

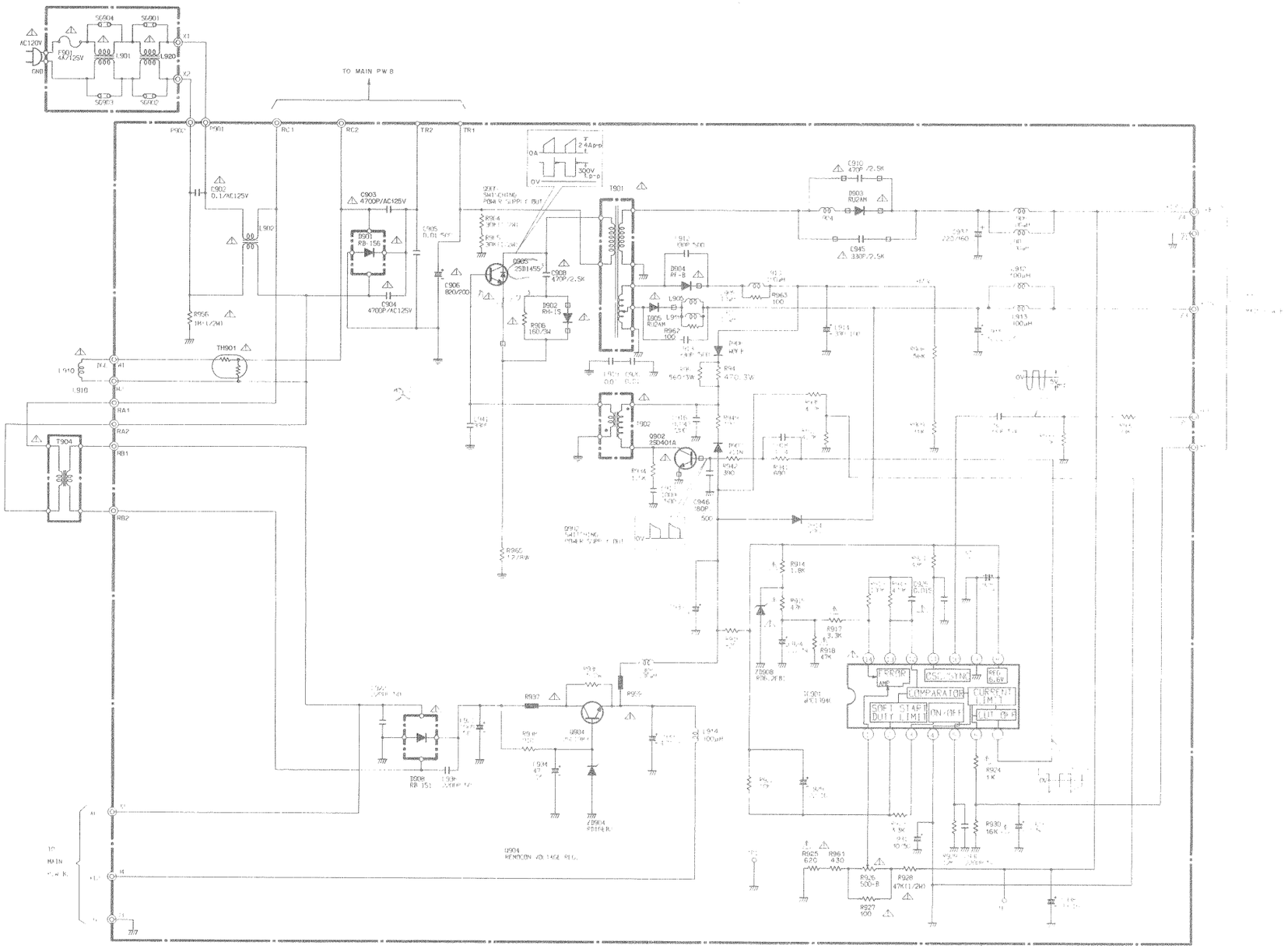


R.G.B. CIRCUIT DIAGRAM (CT3000S/CT3000W)



POWER CIRCUIT DIAGRAM (CT3000S/CT3000W)

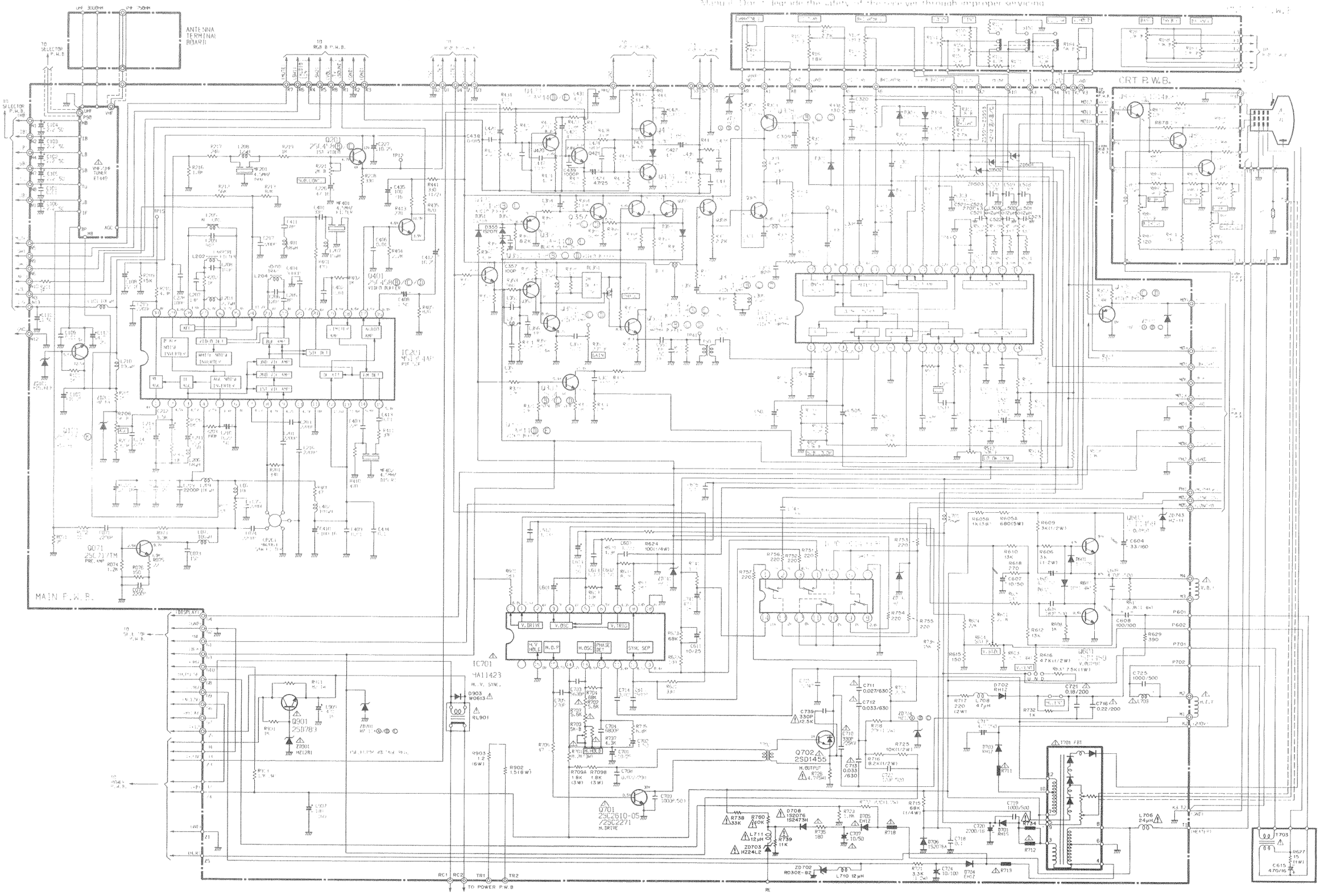
PRODUCT SAFETY NOTE: Components market with a ⚠, and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.



- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.
- All DC voltage to be measured with a tester (100kΩ/V).
  Voltage taken on a complex color bar signal including a standard color bar signal.

MAIN CIRCUIT DIAGRAM (CT3000S/CT3000W)

PRODUCT SAFETY NOTE: Components market with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Do not degrade the safety of the set by improper servicing.



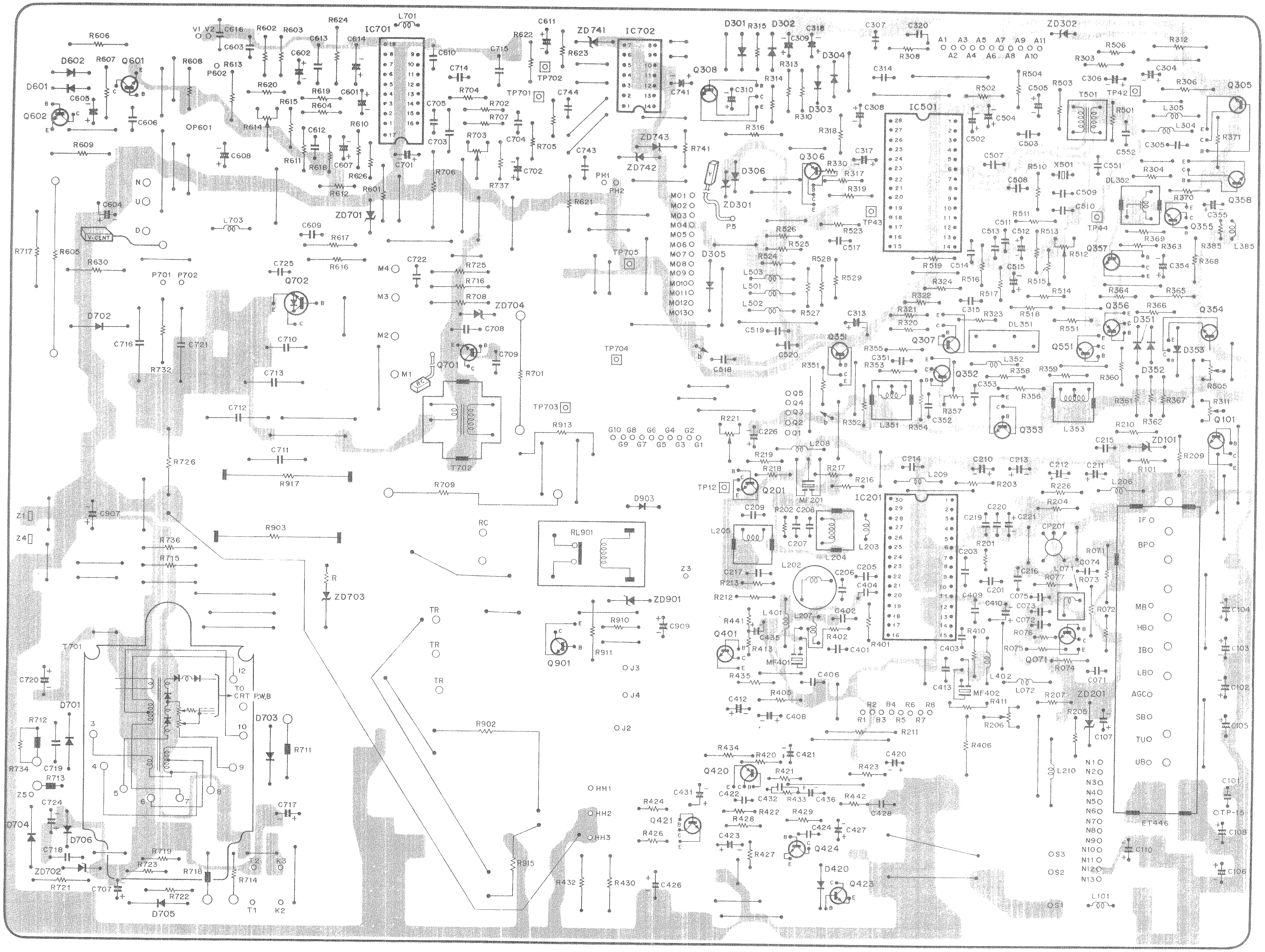
- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.
- All DC voltage to be measured with a tester (100kΩ/V).
  Voltage taken on a complex color bar signal including a standard color bar signal.

PRINTED WIRING BOARD

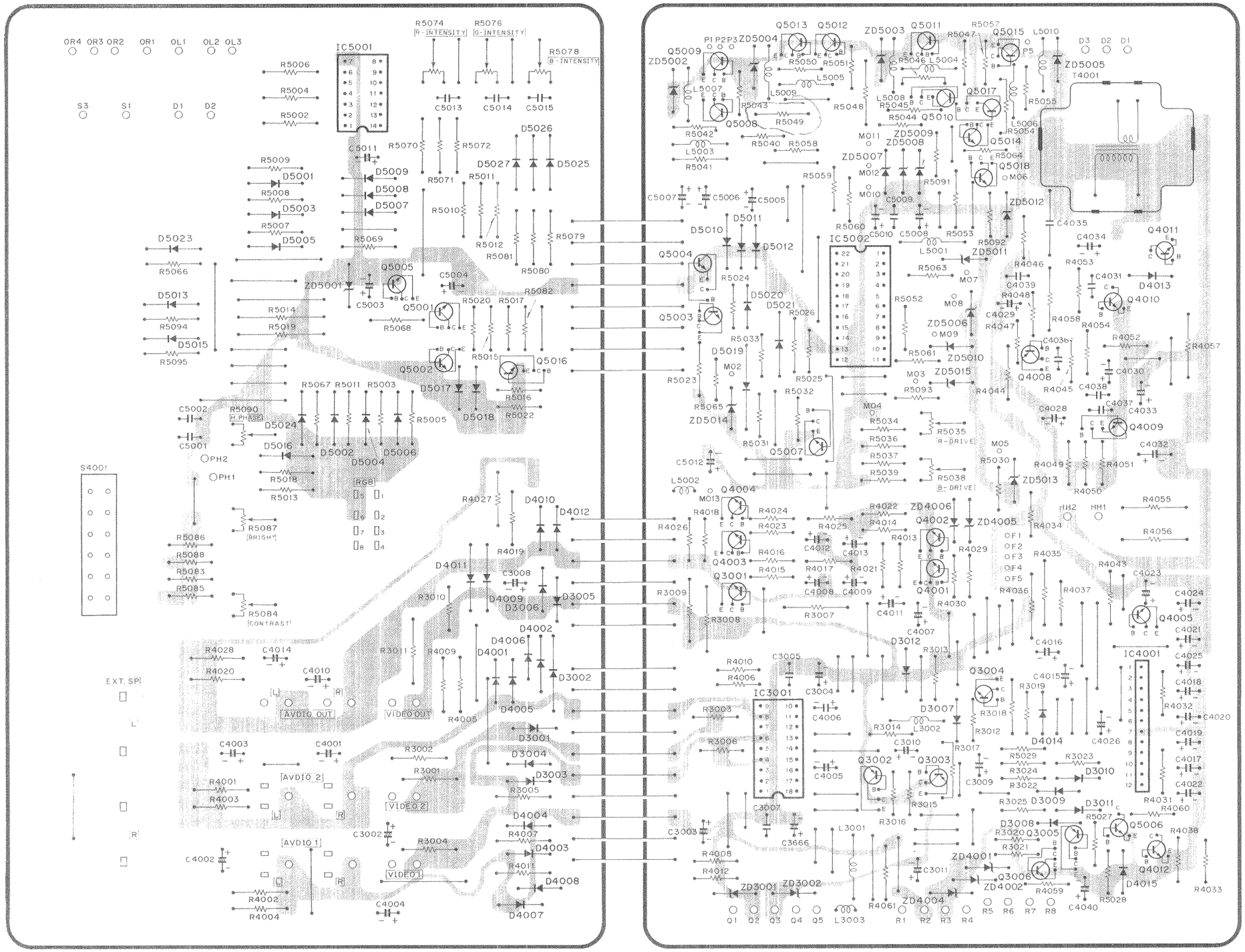
MAIN P.W. BOARD

.... +B PATTERN

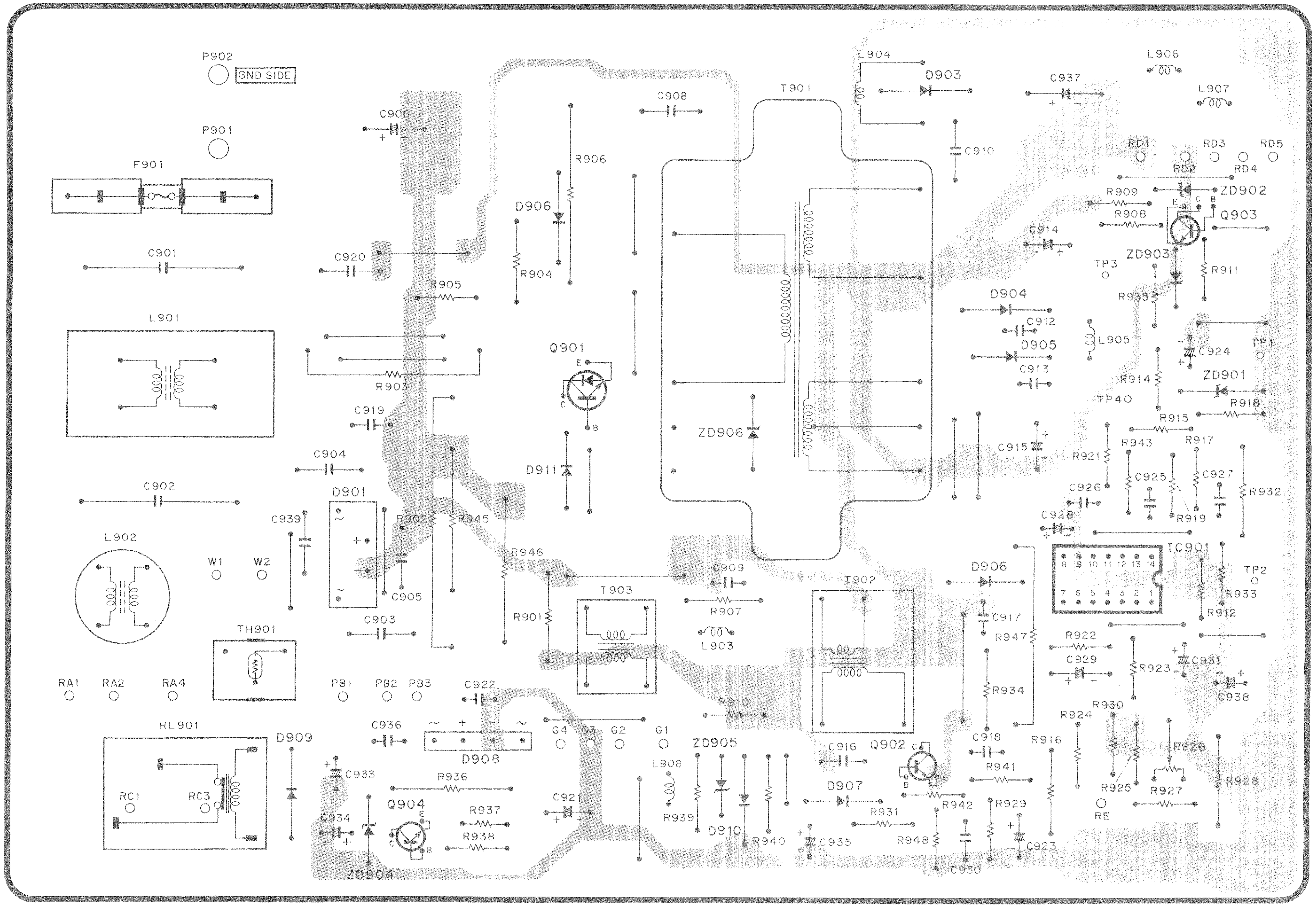
.... GROUND PATTERN



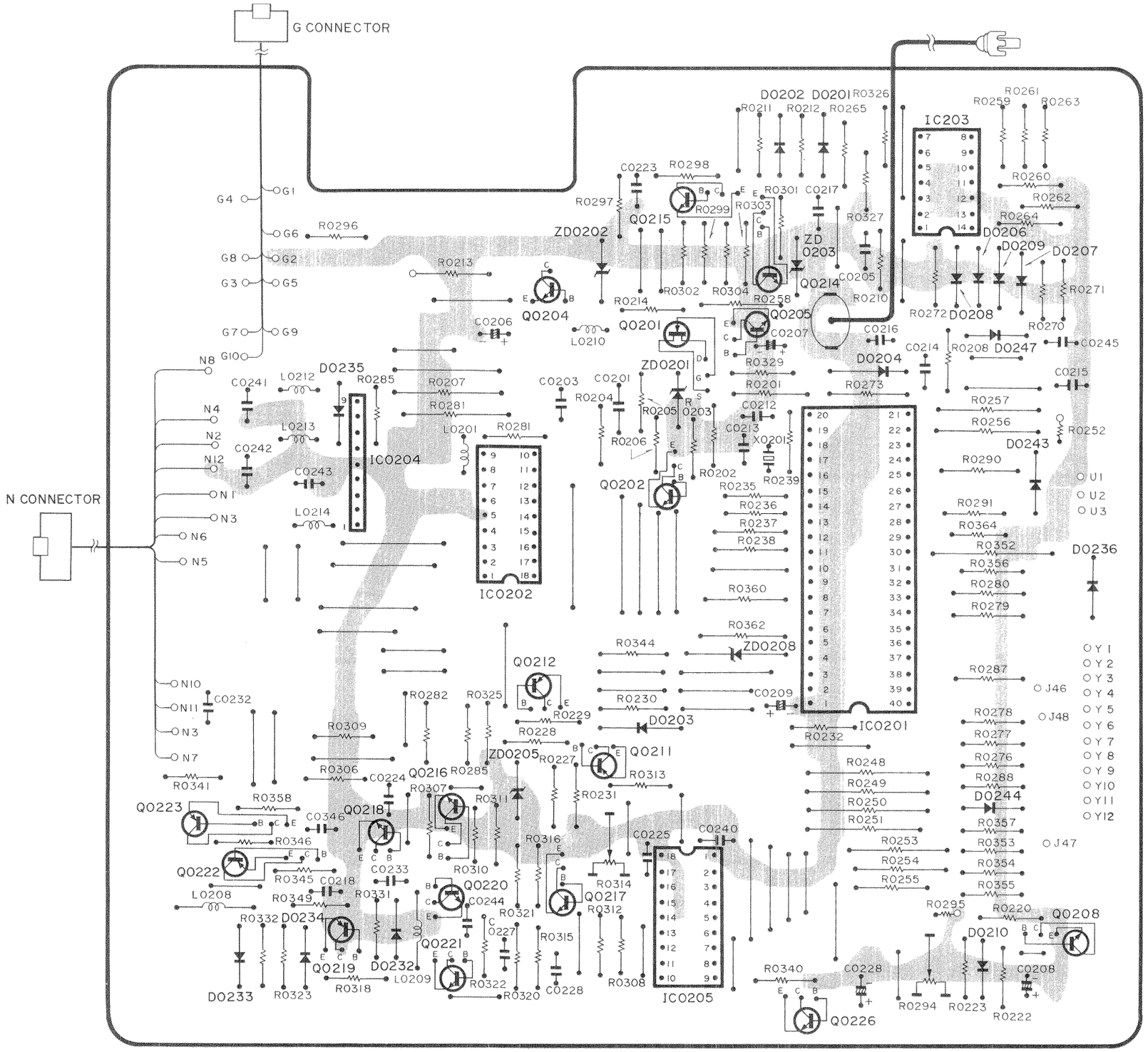
R.G.B. P.W. BOARD


IC5001
IC5002
IC3001
IC4001
R-INTENSITY
G-INTENSITY
B-INTENSITY
H. PHASE
BRIGHT
CONTRAST
R-DRIVE
G-DRIVE
B-DRIVE
AVDIO OUT
VIDEO OUT
AVDIO 2
VIDEO 2
AVDIO 1
VIDEO 1
EXT. SP
RGB
OR4 OR3 OR2 OR1 OL1 OL2 OL3
S3 S1 D1 D2
PH1 PH2
HH1 HH2
OF1 OF2 OF3 OF4 OF5
Q1 Q2 Q3 Q4 Q5 R1 R2 R3 R4 R5 R6 R7 R8

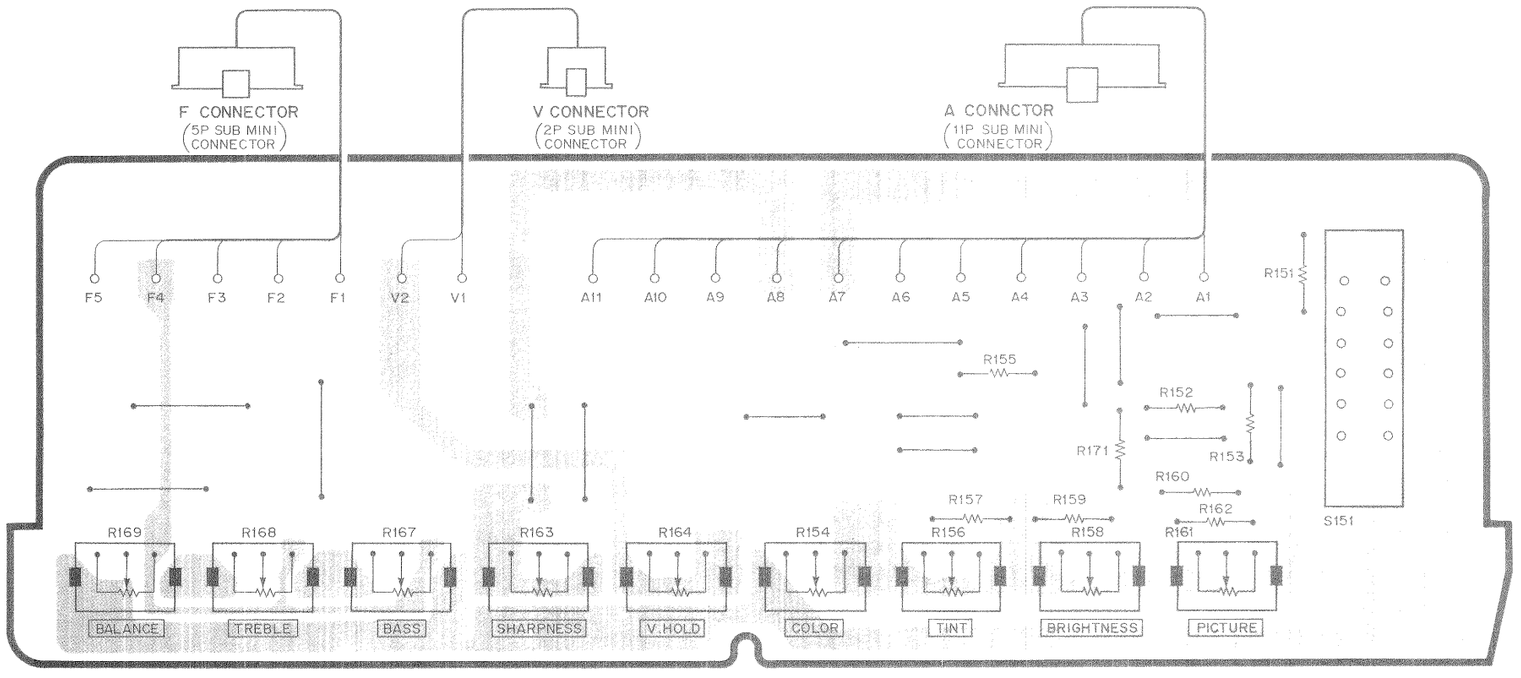
POWER P.W. BOARD



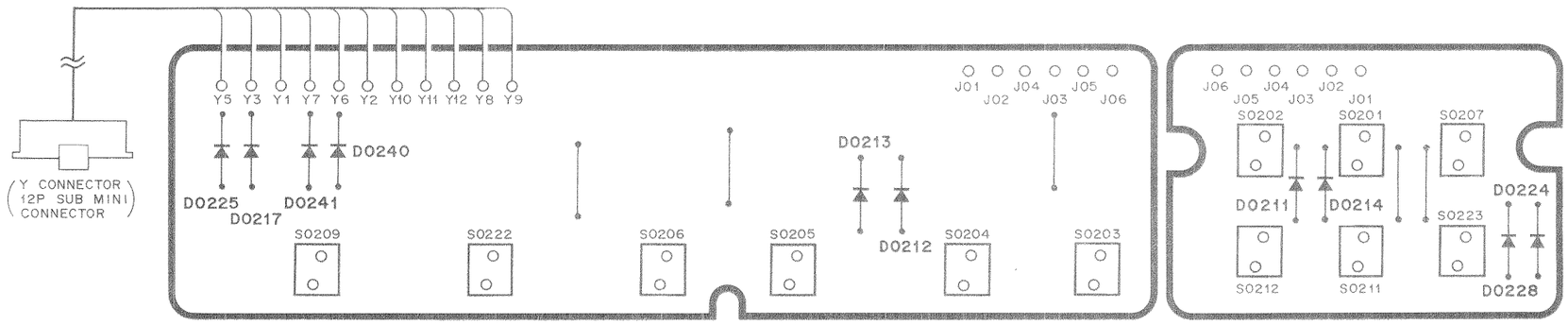
PROGRAM SELECTOR P.W. BOARD



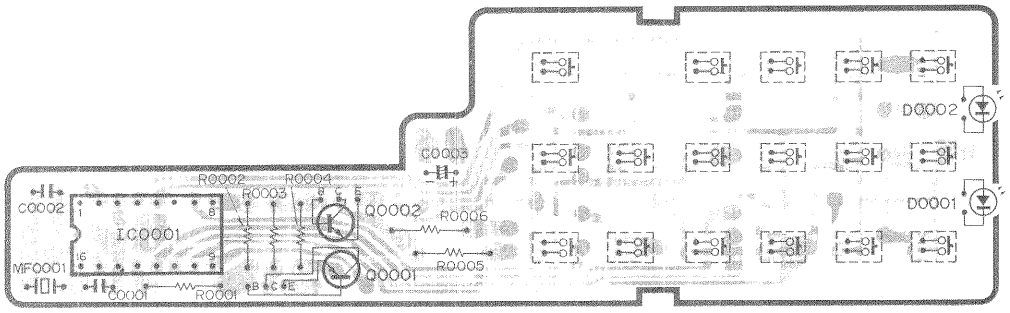
CONTROL P.W. BOARD



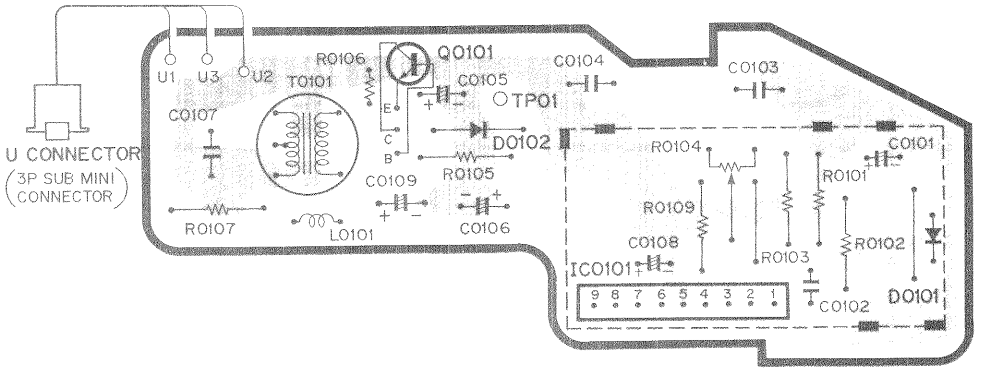
KEY SWITCH P.W. BOARD



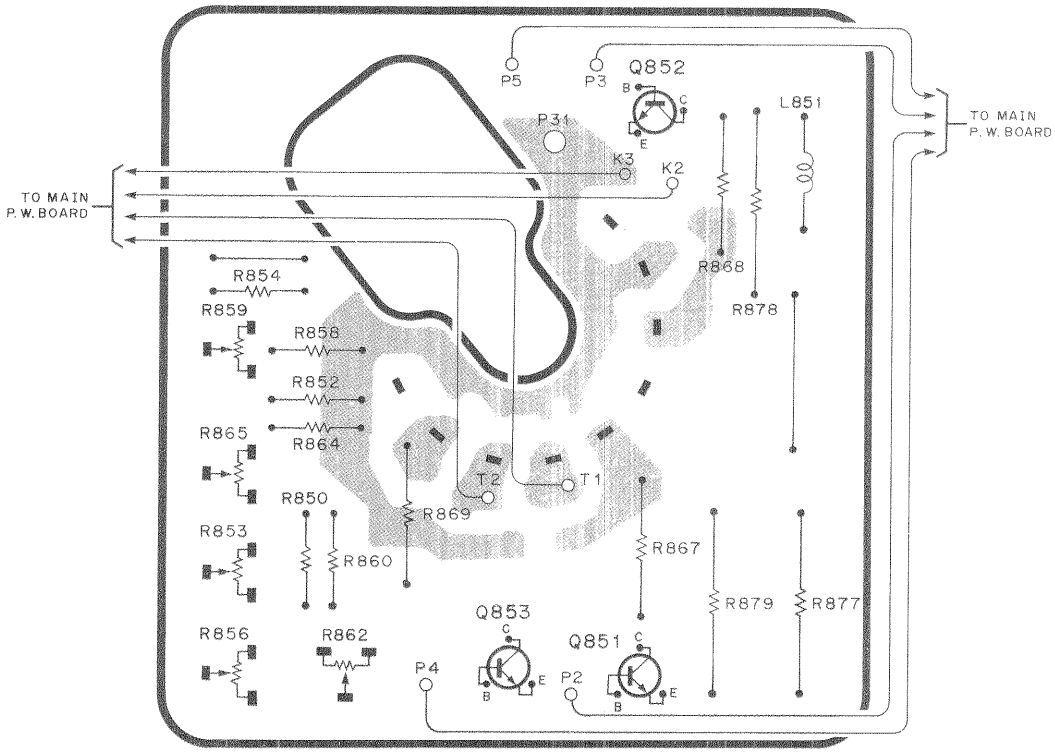
REMOTE CONTROL TRANSMITTER P.W. BOARD



REMOTE CONTROL RECEIVER P.W. BOARD



C.R.T. P.W. BOARD


P5
P3
Q852
B
C
E
P31
K3
K2
L851
TO MAIN
P. W. BOARD
TO MAIN
P. W. BOARD
R854
R859
R858
R852
R865
R864
R850
R869
R853
R860
R856
R862
T2
T1
R868
R878
R867
R879
R877
Q853
Q851
P4
P2

REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

ABBREVIATIONS: Capacitors . . . . . CD: Ceramic disk, PF: Polyester film, EL: Electrolytic. PP: Polypropylene, PR: Paper, TA: Tantalum, TM: Trimmer.
Resistors . . . . . CF: Carbon film, CC: Carbon composition, OMF: Metal oxide film. VR: Variable resistor, WW: Wire would, FR: Fuse resistor.

CAPACITORS

SYMBOL NO.	PART NO.	DESCRIPTION
C0001	0248684	CD 100PF +-5% 50V
C0002	0248684	CD 100PF +-5% 50V
C0003	0253011	EL 220MF DC6.3WV
C0101	0252817	EL 2.2MF 50V
C0102	0244117	CD 680PF +-10% 50V
C0103	0277021	PF 0.047MF +-10% 50V
C0104	0277021	PF 0.047MF +-10% 50V
C0105	0252807	EL 0.33MF 50V
C0106	0252621	EL 10MF 25V
C0107	0299990	PP 2200PF +-10% 100V
C0108	0252807	EL 0.33MF 50V
C0109	0252525	EL 47MF 16V
C0201	0277029	PF 0.22MF +-10% 50V
C0203	0277021	PF 0.047MF +-10% 50V
C0205	0277019	PF 0.033MF +-10% 50V
C0206	0253031	EL 220MF 10V
C0207	0253082	EL 1MF 50V
C0208	0253065	EL 4.7MF 25V
C0209	0253082	EL 1MF 50V
C0210	0277013	PF 0.01MF +-10% 50V
C0212	0246448	CD 22PF +-5% 50V
C0213	0246420	CD 10PF +-0.5% 50V
C0214	0277013	PF 0.01MF +-10% 50V
C0215	0277013	PF 0.01MF +-10% 50V
C0216	0253030	EL 100MF 10V
C0217	0277025	PF 0.1MF +-10% 200V
C0218	0277001	PF 1000PF +-10% 50V
C0219	0277001	PF 1000PF +-10% 50V
C0223	0277017	PF 0.022MF +-10% 50V
C0224	0277011	PF 6800 PF+-10% 50V
C0225	0248684	CD 100PF +-5% 50V
C0226	0248692	CD 220PF +-5% 50V
C0227	0248692	CD 220PF +-5% 50V
C0228	0253051	EL 220MF 16V
C0232	0248684	CD 100PF +-5% 50V
C0240	0277013	PF 0.01MF +-10% 50V
C0241	0277001	PF 1000PF +-10% 50V
C0242	0277001	PF 1000PF +-10% 50V
C0243	0277001	PF 1000PF +-10% 50V
C0244	0248640	CD 150PF +-0.25PF 50V
C0245	0277021	PF 0.047MF +-10% 50V
C0247	0277013	PF 0.01MF +-10% 50V
C071	0244105	CD 2200PF +-10% 50V
C072	0244105	CD 2200PF +-10% 50V
C073	0246444	CD 15PF +-5% 50V
C074	0244105	CD 2200PF +-10% 50V
C075	0244105	CD 2200PF +-10% 50V
C101	0277013	PF 0.01MF +-10% 50V
C102	0253083	EL 2.2MF 50V
C103	0253083	EL 2.2MF 50V
C104	0253083	EL 2.2MF 50V
C105	0253083	EL 2.2MF 50V
C106	0253083	EL 2.2MF 50V
C107	0253066	EL 10MF 25V
C108	0253047	EL 22MF 16V
C109	0277013	PF 0.01MF +-10% 50V
C110	0253082	EL 1MF 50V
C112	0253065	EL 4.7MF 25V
C201	0244105	CD 2200PF +-10% 50V
C203	0244105	CD 2200PF +-10% 50V
C205	0246418	CD 8PF +-0.25PF 50V
C206	0246466	CD 120PF +-5% 50V
C207	0246443	CD 13PF +-5% 50V
C208	0246464	CD 100PF +-5% 50V
C209	0246463	CD 91PF +-5% 50V
C210	0252806	EL 0.22MF 50V
C211	0253083	EL 2.2MF 50V
C212	0253082	EL 1MF 50V
C213	0252805	EL 0.1MF 50V
C214	0244105	CD 2200PF +-10% 50V
C215	0244105	CD 2200PF +-10% 50V
C216	0244105	CD 2200PF +-10% 50V
C217	0244105	CD 2200PF +-10% 50V
C219	0244105	CD 2200PF +-10% 50V
C220	0248680	CD 68PF +-5% 50V
C221	0253047	EL 22MF 16V
C226	0253049	EL 47MF 16V
C227	0253066	EL 10MF 25V
C228	0248684	CD 100PF +-5% 50V
C229	0277013	PF 0.01MF +-10% 50V
C3001	0253066	EL 10MF 25V
C3002	0253066	EL 10MF 25V
C3003	0253066	EL 10MF 25V
C3004	0253069	EL 47MF 25V
C3005	0276823	PF 0.01MF +-5% 50V

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SYMBOL NO.	PART NO.	DESCRIPTION
C3006	0253050	EL 100MF 16V
C3007	0276823	PF 0.01MF +-5% 50V
C3008	0253053	EL 470MF 16V
C3009	0253050	EL 100MF 16V
C3010	0253066	EL 10MF 25V
C3011	0253050	EL 100MF 16V
C304	0253065	EL 4.7MF 25V
C305	0277013	PF 0.01MF +-10% 50V
C306	0253066	EL 10MF 25V
C307	0244139	CD 1000PF +-10% 50V
C308	0253066	EL 10MF 25V
C309	0253048	EL 33MF 16V
C310	0253065	EL 4.7MF 25V
C313	0253055	EL 2200MF 16V
C314	0248682	CD 82PF +-5% 50V
C315	0244113	CD 330PF +-10% 50V
C317	0252806	EL 0.22MF 50V
C318	0253083	EL 2.2MF 50V
C320	0277013	PF 0.01MF +-10% 50V
C351	0248684	CD 100PF +-5% 50V
C352	0248682	CD 82PF +-5% 50V
C353	0277013	PF 0.01MF +-10% 50V
C354	0253047	EL 22MF 16V
C355	0253066	EL 10MF 25V
C356	0248672	CD 33PF +-5% 50V
C357	0248684	CD 100PF +-5% 50V
C4001	0253082	EL 1MF 50V
C4002	0253082	EL 1MF 50V
C4003	0253082	EL 1MF 50V
C4004	0253082	EL 1MF 50V
C4005	0253082	EL 1MF 50V
C4006	0253082	EL 1MF 50V
C4007	0253082	EL 1MF 50V
C4008	0253049	EL 47MF 16V
C4009	0253082	EL 1MF 50V
C401	0248672	CD 33PF +-5% 50V
C4010	0253082	EL 1MF 50V
C4011	0253082	EL 1MF 50V
C4012	0253049	EL 47MF 16V
C4013	0253082	EL 1MF 50V
C4014	0253082	EL 1MF 50V
C4015	0253082	EL 1MF 50V
C4016	0253082	EL 1MF 50V
C4017	0252806	EL 0.22MF 50V
C4018	0252806	EL 0.22MF 50V
C4019	0253082	EL 1MF 50V
C402	0244171	CD 0.01MF +80-20% 50V
C4020	0253082	EL 1MF 50V
C4021	0253082	EL 1MF 50V
C4022	0253082	EL 1MF 50V
C4023	0253051	EL 220MF 16V
C4024	0253053	EL 470MF 16V
C4025	0252806	EL 0.22MF 50V
C4026	0252806	EL 0.22MF 50V
C4028	0253053	EL 470MF 16V
C4029	0253049	EL 47MF 16V
C403	0246448	CD 22PF +-5% 50V
C4030	0253065	EL 4.7MF 25V
C4031	0244117	CD 680PF +-10% 50V
C4032	0253073	EL 470MF 25V
C4032	0253074	EL 1000MF 25V
C4035	0277025	PF 0.1MF +-10% 200V
C4036	0244105	CD 2200PF +-10% 50V
C4038	0244139	CD 1000PF +-10% 50V
C4039	0277015	PF 0.015MF +-10% 50V
C404	0244107	CD 3300PF +-10% 50V
C4040	0253065	EL 4.7MF 25V
C4041	0248684	CD 100PF +-5% 50V
C4042	0253082	EL 1MF 50V
C4043	0248684	CD 100PF +-5% 50V
C4044	0253053	EL 470MF 16V
C406	0244171	CD 0.01MF +80-20% 50V
C408	0253082	EL 1MF 50V
C409	0244171	CD 0.01MF +80-20% 50V
C410	0253050	EL 100MF 16V
C411	0248680	CD 68PF +-5% 50V
C412	0253066	EL 10MF 25V
C413	0276823	PF 0.01MF +-5% 50V
C420	0253082	EL 1MF 50V
C421	0253049	EL 47MF 16V
C422	0244105	CD 2200PF +-10% 50V
C423	0253065	EL 4.7MF 25V
C424	0244117	CD 680PF +-10% 50V
C426	0253074	EL 1000MF 25V
C427	0253073	EL 470MF 25V
C428	0277025	PF 0.1MF +-10% 200V
C431	0253053	EL 470MF 16V
C432	0248684	CD 100PF +-5% 50V
C434	0277025	PF 0.1MF +-10% 200V
C435	0253050	EL 100MF 16V
C436	0253082	EL 1MF 50V
C437	0248684	CD 100PF +-5% 50V
C438	0277015	PF 0.015MF +-10% 50V
C439	0244139	CD 1000PF +-10% 50V
C5001	0244139	CD 1000PF +-10% 50V
C5002	0244139	CD 1000PF +-10% 50V
C5003	0253065	EL 4.7MF 25V
C5004	0253050	EL 100MF 16V
C5005	0253082	EL 1MF 50V
C5006	0253082	EL 1MF 50V

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SYMBOL NO.	PART NO.	DESCRIPTION
C5007	0253082	EL 1MF 50V
C5008	0253050	EL 100MF 16V
C5009	0244105	CD 2200PF +-10% 50V
C5010	0253066	EL 10MF 25V
C5011	0253066	EL 10MF 25V
C5012	0253050	EL 100MF 16V
C502	0253066	EL 10MF 25V
C503	0248692	CD 220PF +-5% 50V
C504	0253066	EL 10MF 25V
C505	0252806	EL 0.22MF 50V
C507	0277013	PF 0.01MF +-10% 50V
C508	0246454	CD 39PF +-5% 50V
C509	0246448	CD 22PF +-5% 50V
C510	0246450	CD 27PF +-5% 50V
C511	0277019	PF 0.033MF +-10% 50V
C512	0253066	EL 10MF 25V
C513	0248672	CD 33PF +-5% 50V
C514	0248684	CD 100PF +-5% 50V
C515	0253082	EL 1MF 50V
C517	0277013	PF 0.01MF +-10% 50V
C518	0244136	CD 270 PF+-10% 50V
C519	0244136	CD 270 PF+-10% 50V
C520	0244136	CD 270 PF+-10% 50V
C521	0244136	CD 270 PF+-10% 50V
C522	0244136	CD 270 PF+-10% 50V
C523	0244136	CD 270 PF+-10% 50V
C551	0248674	CD 39PF +-5% 50V
C552	0248674	CD 39PF +-5% 50V
C601	0292706	PP 1MF 25V
C602	0253082	EL 1MF 50V
C603	0277019	PF 0.033MF +-10% 50V
C604	0253458	EL 33 MF 160V
C605	0253085	EL 4.7MF 50V
C606	0243504	CD 180PF +-10% 500V
C607	0253086	EL 10MF 50V
C608	0253290	EL 100MF 100V
C609	0244565	CD 4700PF +100-0% 500V
C610	0244103	CD 1500PF +-10% 50V
C611	0253066	EL 10MF 25V
C612	0277019	PF 0.033MF +-10% 50V
C613	0277017	PF 0.022MF +-10% 50V
C614	0252532	EL 220MF 16V
C615	0253053	EL 470MF 16V
C616	0277017	PF 0.022MF +-10% 50V
C701	0253066	EL 10MF 25V
C702	0253082	EL 1MF 50V
C703	0279211	PF 5600PF 50V
C704	0244111	CD 6800PF +-10% 50V
C705	0244136	CD 270 PF+-10% 50V
⚠ C707	0253086	EL 10MF 50V
C708	0299918	PP 0.022MF +-10% 200V
C709	0244501	CD 1000PF +-10% 500V
⚠ C710	0243837	CD 330PF +-10% 2.5KV
⚠ C711	0299995	PP 0.027MF +-5% 630V
⚠ C712	0299996	PP 0.033MF +-5% 630V
⚠ C713	0299996	PP 0.033MF +-5% 630V
C714	0277015	PF 0.015MF +-10% 50V
C715	0277021	PF 0.047MF +-10% 50V
⚠ C716	0299930	PP 0.22MF +-10% 200V
C717	0259842	EL 4.7MF 250V (HR)
C718	0277025	PF 0.1MF +-10% 50V
C719	0244501	CD 1000PF +-10% 500V
C720	0253055	EL 2200MF 16V
⚠ C721	0299929	PP 0.18MF +-10% 200V
C722	0247856	CD 120PF +-5% 500V
C724	0253286	EL 10MF 100V
C725	0244501	CD 1000PF +-10% 500V
⚠ C739	0243837	CD 330PF +-10% 2.5KV
C741	0253053	EL 470MF 16V
C743	0244105	CD 2200PF +-10% 50V
⚠ C902	0279718	MP 0.1MF+-10% 125V
⚠ C903	0249150	CD 4700PF AC125V
⚠ C904	0249150	CD 4700PF AC125V
C905	0244541	CD 0.01MF +-10% 500V
⚠ C906	0259977	EL 820MF DC200WV
C907	0258589	EL 100MF 160V
⚠ C908	0243824	CD 470PF +-10% 2.5KV
C909	0253053	EL 470MF 16V
⚠ C910	0243824	CD 470PF +-10% 2.5KV
C912	0243507	CD 330PF +-10% 500V
C913	0243507	CD 330PF +-10% 500V
C914	0253292	EL 330MF+-20% 100V
C915	0252636	EL 1000MF 25V
C916	0299922	PP 0.047MF +-10% 200V
C917	0244501	CD 1000PF +-10% 500V
C918	0276831	PF 0.047MF +-10% 50V
C919	0249146	CD 0.01MF +-10% 125V
C920	0249146	CD 0.01MF +-10% 125V
C921	0253094	EL 1000MF 50V
C922	0244105	CD 2200PF +-10% 50V
C923	0253082	EL 1MF 50V
C924	0253083	EL 2.2MF 50V
⚠ C925	0276825	PF 0.015MF +-5% 50V
C926	0276815	PF 2200PF +-5% 50V
C927	0243507	CD 330PF +-10% 500V
C928	0253066	EL 10MF 25V
C929	0253047	EL 22MF 16V
C930	0276815	PF 2200PF +-5% 50V
C931	0253086	EL 10MF 50V
C933	0253053	EL 470MF 16V

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SYMBOL NO.	PART NO.	DESCRIPTION
C934	0253069	EL 47MF 25V
C935	0253051	EL 220MF 16V
C936	0244105	CD 2200PF +-10% 50V
C937	0259899	EL 220MF 160V
C938	0253458	EL 33 MF 160V
C941	0244113	CD 330PF +-10% 50V
⚠ C945	0243837	CD 330PF +-10% 2,5KV
C946	0243504	CD 180PF +-10% 500V
		RESISTORS
R0001	0187075	CF 2,7K OHM +-5% 1/16W
R0002	0187089	CF 10K OHM +-5% 1/16W
R0003	0187031	CF 39 OHM +-5% 1/16W
R0004	0187089	CF 10K OHM +-5% 1/16W
R0005	0100001	CF 2,2 OHM +-5% 1/8W
R0006	0100001	CF 2,2 OHM +-5% 1/8W
R0101	0100113	CF 100K OHM +-5% 1/8W
R0102	0100075	CF 2,7K OHM +-5% 1/8W
R0103	0100049	CF 220 OHM +-5% 1/8W
R0104	0150035	VR 1K OHM-B RS-8
R0105	0100061	CF 680 OHM +-5% 1/8W
R0106	0100045	CF 150 OHM +-5% 1/8W
R0107	0100053	CF 330 OHM +-5% 1/8W
R0109	0100083	CF 5,6K OHM +-5% 1/8W
R0201	0100077	CF 3,3K OHM +-5% 1/8W
R0202	0100093	CF 15K OHM +-5% 1/8W
R0203	0100077	CF 3,3K OHM +-5% 1/8W
R0204	0100109	CF 68K OHM +-5% 1/8W
R0205	0100057	CF 470 OHM +-5% 1/8W
R0206	0100099	CF 27K OHM +-5% 1/8W
R0207	0100061	CF 680 OHM +-5% 1/8W
R0208	0100089	CF 10K OHM +-5% 1/8W
R0210	0100107	CF 56K OHM +-5% 1/8W
R0211	0100049	CF 220 OHM +-5% 1/8W
R0212	0100093	CF 15K OHM +-5% 1/8W
R0213	0110117	MF 68 OHM +-5% 1W
R0214	0100065	CF 1K OHM +-5% 1/8W
R0219	0100081	CF 4,7K OHM +-5% 1/8W
R0220	0100089	CF 10K OHM +-5% 1/8W
R0222	0100081	CF 4,7K OHM +-5% 1/8W
R0223	0100081	CF 4,7K OHM +-5% 1/8W
R0227	0100081	CF 4,7K OHM +-5% 1/8W
R0228	0100073	CF 2,2K OHM +-5% 1/8W
R0229	0100107	CF 56K OHM +-5% 1/8W
R0230	0100107	CF 56K OHM +-5% 1/8W
R0231	0100065	CF 1K OHM +-5% 1/8W
R0232	0100107	CF 56K OHM +-5% 1/8W
R0235	0100083	CF 5,6K OHM +-5% 1/8W
R0236	0100083	CF 5,6K OHM +-5% 1/8W
R0237	0100083	CF 5,6K OHM +-5% 1/8W
R0238	0100083	CF 5,6K OHM +-5% 1/8W
R0239	0100117	CF 150K OHM +-5% 1/8W
R0248	0100089	CF 10K OHM +-5% 1/8W
R0249	0100089	CF 10K OHM +-5% 1/8W
R0250	0100089	CF 10K OHM +-5% 1/8W
R0251	0100089	CF 10K OHM +-5% 1/8W
R0252	0100113	CF 100K OHM +-5% 1/8W
R0253	0100113	CF 100K OHM +-5% 1/8W
R0254	0100113	CF 100K OHM +-5% 1/8W
R0255	0100113	CF 100K OHM +-5% 1/8W
R0256	0100089	CF 10K OHM +-5% 1/8W
R0257	0100113	CF 100K OHM +-5% 1/8W
R0258	0100065	CF 1K OHM +-5% 1/8W
R0259	0100089	CF 10K OHM +-5% 1/8W
R0260	0100097	CF 22K OHM +-5% 1/8W
R0261	0100083	CF 5,6K OHM +-5% 1/8W
R0262	0100077	CF 3,3K OHM +-5% 1/8W
R0263	0100087	CF 8,2K OHM +-5% 1/8W
R0264	0100086	CF 7,5K OHM +-5% 1/8W
R0265	0100065	CF 1K OHM +-5% 1/8W
R0270	0100089	CF 10K OHM +-5% 1/8W
R0271	0100089	CF 10K OHM +-5% 1/8W
R0272	0100113	CF 100K OHM +-5% 1/8W
R0273	0100073	CF 2,2K OHM +-5% 1/8W
R0276	0100065	CF 1K OHM +-5% 1/8W
R0277	0100065	CF 1K OHM +-5% 1/8W
R0278	0100065	CF 1K OHM +-5% 1/8W
R0279	0100073	CF 2,2K OHM +-5% 1/8W
R0280	0100073	CF 2,2K OHM +-5% 1/8W
R0281	0100065	CF 1K OHM +-5% 1/8W
R0282	0100089	CF 10K OHM +-5% 1/8W
R0283	0100089	CF 10K OHM +-5% 1/8W
R0285	0100083	CF 5,6K OHM +-5% 1/8W
R0287	0100065	CF 1K OHM +-5% 1/8W
R0288	0100065	CF 1K OHM +-5% 1/8W
R0290	0100065	CF 1K OHM +-5% 1/8W
R0294	0150039	VR RS-8 20 KOHM-B
R0295	0100113	CF 100K OHM +-5% 1/8W
R0296	0100111	CF 82K OHM +-5% 1/8W
R0297	0100111	CF 82K OHM +-5% 1/8W
R0298	0100077	CF 3,3K OHM +-5% 1/8W
R0299	0100081	CF 4,7K OHM +-5% 1/8W
R0301	0100047	CF 180 OHM +-5% 1/8W
R0302	0100097	CF 22K OHM +-5% 1/8W
R0303	0100113	CF 100K OHM +-5% 1/8W
R0304	0100081	CF 4,7K OHM +-5% 1/8W
R0306	0100097	CF 22K OHM +-5% 1/8W
R0307	0100079	CF 3,9K OHM +-5% 1/8W
R0308	0100089	CF 10K OHM +-5% 1/8W

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SYMBOL NO.	PART NO.	DESCRIPTION	SYMBOL NO.	PART NO.	DESCRIPTION
R0309	0100093	CF 15K OHM +-5% 1/8W	R154	0150433	VR RV-12 10K OHM-B
R0310	0100093	CF 15K OHM +-5% 1/8W	R155	0100083	CF 5.6K OHM +-5% 1/8W
R0311	0100089	CF 10K OHM +-5% 1/8W	R156	0150433	VR RV-12 10K OHM-B
R0312	0100089	CF 10K OHM +-5% 1/8W	R157	0100079	CF 3.9K OHM +-5% 1/8W
R0313	0100053	CF 330 OHM +-5% 1/8W	R158	0150429	VR 500 OHM-B RV-12
R0314	0150036	VR 2K OHM-B RS-8	R159	0100093	CF 15K OHM +-5% 1/8W
R0315	0100081	CF 4.7K OHM +-5% 1/8W	R160	0100075	CF 2.7K OHM +-5% 1/8W
R0316	0100089	CF 10K OHM +-5% 1/8W	R161	0150433	VR RV-12 10K OHM-B
R0318	0100077	CF 3.3K OHM +-5% 1/8W	R162	0100071	CF 1.8K OHM +-5% 1/8W
R0320	0100081	CF 4.7K OHM +-5% 1/8W	R163	0150431	VR RV-12 1K OHM-C
R0321	0100089	CF 10K OHM +-5% 1/8W	R164	0150423	VR RV-12 5K OHM-B
R0322	0100063	CF 820 OHM +-5% 1/8W	R167	0150424	VR RV-12 10KOHM-B
R0323	0100045	CF 150 OHM +-5% 1/8W	R168	0150424	VR RV-12 10KOHM-B
R0325	0100097	CF 22K OHM +-5% 1/8W	R169	0150433	VR RV-12 10K OHM-B
R0326	0100091	CF 12K OHM +-5% 1/8W	R171	0100065	CF 1K OHM +-5% 1/8W
R0327	0100069	CF 1.5K OHM +-5% 1/8W	R201	0100053	CF 330 OHM +-5% 1/8W
R0328	0100089	CF 10K OHM +-5% 1/8W	R202	0100065	CF 1K OHM +-5% 1/8W
R0329	0100073	CF 2.2K OHM +-5% 1/8W	R203	0100127	CF 390K OHM +-5% 1/8W
R0331	0100055	CF 390 OHM +-5% 1/8W	R204	0100055	CF 390 OHM +-5% 1/8W
R0332	0100065	CF 1K OHM +-5% 1/8W	R205	0100065	CF 1K OHM +-5% 1/8W
R0340	0100083	CF 5.6K OHM +-5% 1/8W	R206	0150037	VR 5K OHM-B RS-8
R0341	0100053	CF 330 OHM +-5% 1/8W	R207	0100079	CF 3.9K OHM +-5% 1/8W
R0344	0100077	CF 3.3K OHM +-5% 1/8W	R209	0100093	CF 15K OHM +-5% 1/8W
R0345	0100089	CF 10K OHM +-5% 1/8W	R210	0100080	CF 4.3K OHM +-5% 1/8W
R0346	0100097	CF 22K OHM +-5% 1/8W.	R211	0100065	CF 1K OHM +-5% 1/8W
R0349	0100065	CF 1K OHM +-5% 1/8W	R212	0100107	CF 56K OHM +-5% 1/8W
R0352	0100081	CF 4.7K OHM +-5% 1/8W	R213	0100111	CF 82K OHM +-5% 1/8W
R0353	0100065	CF 1K OHM +-5% 1/8W	R216	0100071	CF 1.8K OHM +-5% 1/8W
R0354	0100065	CF 1K OHM +-5% 1/8W	R217	0100050	CF 240 OHM +-5% 1/8W
R0355	0100065	CF 1K OHM +-5% 1/8W	R218	0100053	CF 330 OHM +-5% 1/8W
R0356	0100065	CF 1K OHM +-5% 1/8W	R219	0100065	CF 1K OHM +-5% 1/8W
R0357	0100065	CF 1K OHM +-5% 1/8W	R221	0150036	VR 2K OHM-B RS-8
R0358	0100089	CF 10K OHM +-5% 1/8W	R226	0100023	CF 18 OHM +-5% 1/8W
R0360	0100081	CF 4.7K OHM +-5% 1/8W	R3001	0114062	CF 75 OHM +-5% 1/4W
R0361	0100065	CF 1K OHM +-5% 1/8W	R3002	0100041	CF 100 OHM +-5% 1/8W
R0362	0100065	CF 1K OHM +-5% 1/8W	R3003	0100041	CF 100 OHM +-5% 1/8W
R0364	0100117	CF 150K OHM +-5% 1/8W	R3004	0114062	CF 75 OHM +-5% 1/4W
R0365	0100061	CF 680 OHM +-5% 1/8W	R3005	0100041	CF 100 OHM +-5% 1/8W
R0366	0100083	CF 5.6K OHM +-5% 1/8W	R3006	0100041	CF 100 OHM +-5% 1/8W
R071	0100038	CF 75 OHM +-5% 1/8W	R3007	0114143	CF 330 OHM +-5% 1/4W
R072	0100017	CF 10 OHM +-5% 1/8W	R3008	0119508	FR 56 OHM +-5% 1/4W
R073	0100077	CF 3.3K OHM +-5% 1/8W	R3009	0113725	CF 100 OHM +-5% 1/2W
R074	0100067	CF 1.2K OHM +-5% 1/8W	R3010	0100113	CF 100K OHM +-5% 1/8W
R075	0100025	CF 22 OHM +-5% 1/8W	R3011	0113721	CF 68 OHM +-5% 1/2W
R076	0100045	CF 150 OHM +-5% 1/8W	R3012	0100073	CF 2.2K OHM +-5% 1/8W
R077	0100049	CF 220 OHM +-5% 1/8W	R3013	0100065	CF 1K OHM +-5% 1/8W
R101	0100065	CF 1K OHM +-5% 1/8W	R3014	0100113	CF 100K OHM +-5% 1/8W
R151	0100079	CF 3.9K OHM +-5% 1/8W	R3015	0100065	CF 1K OHM +-5% 1/8W
R152	0100081	CF 4.7K OHM +-5% 1/8W	R3016	0100063	CF 820 OHM +-5% 1/8W
R153	0100075	CF 2.7K OHM +-5% 1/8W	R3017	0114143	CF 330 OHM +-5% 1/4W

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SYMBOL NO.	PART NO.	DESCRIPTION
R3018	0114143	CF 330 OHM +-5% 1/4W
R3019	0100089	CF 10K OHM +-5% 1/8W
R3020	0100083	CF 5.6K OHM +-5% 1/8W
R3021	0100083	CF 5.6K OHM +-5% 1/8W
R3022	0100065	CF 1K OHM +-5% 1/8W
R3023	0100065	CF 1K OHM +-5% 1/8W
R3024	0100065	CF 1K OHM +-5% 1/8W
R3025	0100065	CF 1K OHM +-5% 1/8W
R3026	0100081	CF 4.7K OHM +-5% 1/8W
R303	0100043	CF 120 OHM +-5% 1/8W
R304	0100053	CF 330 OHM +-5% 1/8W
R306	0100053	CF 330 OHM +-5% 1/8W
R308	0100044	CF 130 OHM +-5% 1/8W
R310	0100093	CF 15K OHM +-5% 1/8W
R311	0151716	VR 5K OHM-B RV-8
R312	0100075	CF 2.7K OHM +-5% 1/8W
R313	0100049	CF 220 OHM +-5% 1/8W
R314	0100109	CF 68K OHM +-5% 1/8W
R315	0100089	CF 10K OHM +-5% 1/8W
R316	0100089	CF 10K OHM +-5% 1/8W
R317	0100055	CF 390 OHM +-5% 1/8W
R319	0114145	CF 390 OHM +-5% 1/4W
R320	0100091	CF 12K OHM +-5% 1/8W
R321	0100091	CF 12K OHM +-5% 1/8W
R322	0100061	CF 680 OHM +-5% 1/8W
R323	0100065	CF 1K OHM +-5% 1/8W
R324	0100091	CF 12K OHM +-5% 1/8W
R327	0100041	CF 100 OHM +-5% 1/8W
R351	0100065	CF 1K OHM +-5% 1/8W
R352	0100065	CF 1K OHM +-5% 1/8W
R353	0100059	CF 560 OHM +-5% 1/8W
R354	0100073	CF 2.2K OHM +-5% 1/8W
R355	0100065	CF 1K OHM +-5% 1/8W
R356	0114137	CF 180 OHM +-5% 1/4W
R357	0150017	VR 200 OHM-B
R358	0100050	CF 240 OHM +-5% 1/8W
R359	0100065	CF 1K OHM +-5% 1/8W
R360	0100087	CF 8.2K OHM +-5% 1/8W
R361	0100077	CF 3.3K OHM +-5% 1/8W
R362	0100067	CF 1.2K OHM +-5% 1/8W
R363	0100039	CF 82 OHM +-5% 1/8W
R364	0100113	CF 100K OHM +-5% 1/8W
R365	0100085	CF 6.8K OHM +-5% 1/8W
R366	0100069	CF 1.5K OHM +-5% 1/8W
R367	0100089	CF 10K OHM +-5% 1/8W
R368	0100077	CF 3.3K OHM +-5% 1/8W
R369	0100065	CF 1K OHM +-5% 1/8W
R370	0100065	CF 1K OHM +-5% 1/8W
R371	0100073	CF 2.2K OHM +-5% 1/8W
R385	0100062	CF 750 OHM +-5% 1/8W
R4001	0100107	CF 56K OHM +-5% 1/8W
R4002	0100107	CF 56K OHM +-5% 1/8W
R4003	0100107	CF 56K OHM +-5% 1/8W
R4004	0100107	CF 56K OHM +-5% 1/8W
R4005	0100065	CF 1K OHM +-5% 1/8W
R4006	0100065	CF 1K OHM +-5% 1/8W
R4007	0100065	CF 1K OHM +-5% 1/8W
R4008	0100065	CF 1K OHM +-5% 1/8W
R4009	0100065	CF 1K OHM +-5% 1/8W
R401	0100057	CF 470 OHM +-5% 1/8W
R4010	0100065	CF 1K OHM +-5% 1/8W
R4011	0100065	CF 1K OHM +-5% 1/8W
R4012	0100065	CF 1K OHM +-5% 1/8W
R4013	0100065	CF 1K OHM +-5% 1/8W
R4014	0100113	CF 100K OHM +-5% 1/8W
R4015	0100089	CF 10K OHM +-5% 1/8W
R4016	0100101	CF 33K OHM +-5% 1/8W
R4017	0100101	CF 33K OHM +-5% 1/8W
R4018	0100053	CF 330 OHM +-5% 1/8W
R4019	0100059	CF 560 OHM +-5% 1/8W
R402	0100065	CF 1K OHM +-5% 1/8W
R4020	0100113	CF 100K OHM +-5% 1/8W
R4021	0100065	CF 1K OHM +-5% 1/8W
R4022	0100113	CF 100K OHM +-5% 1/8W
R4023	0100089	CF 10K OHM +-5% 1/8W
R4024	0100101	CF 33K OHM +-5% 1/8W
R4025	0100101	CF 33K OHM +-5% 1/8W
R4026	0100053	CF 330 OHM +-5% 1/8W
R4027	0100059	CF 560 OHM +-5% 1/8W
R4028	0100113	CF 100K OHM +-5% 1/8W
R4029	0100083	CF 5.6K OHM +-5% 1/8W
R4030	0100083	CF 5.6K OHM +-5% 1/8W
R4031	0100083	CF 5.6K OHM +-5% 1/8W
R4032	0100083	CF 5.6K OHM +-5% 1/8W
R4033	0100065	CF 1K OHM +-5% 1/8W
R4034	0100065	CF 1K OHM +-5% 1/8W
R4035	0100065	CF 1K OHM +-5% 1/8W
R4036	0100065	CF 1K OHM +-5% 1/8W
R4037	0100065	CF 1K OHM +-5% 1/8W
R4038	0100065	CF 1K OHM +-5% 1/8W
R404	0100073	CF 2.2K OHM +-5% 1/8W
R4043	0100065	CF 1K OHM +-5% 1/8W
R4044	0114147	CF 470 OHM +-5% 1/4W
R4045	0100097	CF 22K OHM +-5% 1/8W
R4046	0100111	CF 82K OHM +-5% 1/8W
R4047	0100071	CF 1.8K OHM +-5% 1/8W
R4048	0100051	CF 270 OHM +-5% 1/8W
R4049	0100081	CF 4.7K OHM +-5% 1/8W
R405	0100063	CF 820 OHM +-5% 1/8W
R4050	0100045	CF 150 OHM +-5% 1/8W

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SYMBOL NO.	PART NO.	DESCRIPTION
R4051	0100059	CF 560 OHM +-5% 1/8W
R4052	0100073	CF 2.2K OHM +-5% 1/8W
R4053	0100093	CF 15K OHM +-5% 1/8W
R4054	0100125	CF 330K OHM +-5% 1/8W
R4055	0113684	CF 2.2 OHM +-5% 1/2W
R4056	0110133	MF 330 OHM +-5% 1W
R4058	0100093	CF 15K OHM +-5% 1/8W
R406	0110113	MF 47 OHM +-5% 1W
R4060	0100089	CF 10K OHM +-5% 1/8W
R4061	0100052	CF 300 OHM +-5% 1/8W
R4063	0100017	CF 10 OHM +-5% 1/8W
R4064	0119508	FR 56 OHM +-5% 1/4W
R4065	0100049	CF 220 OHM +-5% 1/8W
R4066	0100049	CF 220 OHM +-5% 1/8W
R410	0100057	CF 470 OHM +-5% 1/8W
R411	0100053	CF 330 OHM +-5% 1/8W
R413	0100051	CF 270 OHM +-5% 1/8W
R420	0100071	CF 1.8K OHM +-5% 1/8W
R421	0100051	CF 270 OHM +-5% 1/8W
R422	0100097	CF 22K OHM +-5% 1/8W
R423	0100111	CF 82K OHM +-5% 1/8W
R424	0100081	CF 4.7K OHM +-5% 1/8W
R425	0100045	CF 150 OHM +-5% 1/8W
R426	0100059	CF 560 OHM +-5% 1/8W
R427	0100073	CF 2.2K OHM +-5% 1/8W
R428	0100125	CF 330K OHM +-5% 1/8W
R429	0100093	CF 15K OHM +-5% 1/8W
R430	0110133	MF 330 OHM +-5% 1W
R432	0113684	CF 2.2 OHM +-5% 1/2W
R433	0100093	CF 15K OHM +-5% 1/8W
R434	0100057	CF 470 OHM +-5% 1/8W
R435	0100063	CF 820 OHM +-5% 1/8W
R441	0113737	CF 330 OHM +-5% 1/2W
R442	0100017	CF 10 OHM +-5% 1/8W
R5001	0100057	CF 470 OHM +-5% 1/8W
R5002	0100041	CF 100 OHM +-5% 1/8W
R5003	0100057	CF 470 OHM +-5% 1/8W
R5004	0100041	CF 100 OHM +-5% 1/8W
R5005	0100057	CF 470 OHM +-5% 1/8W
R5006	0100041	CF 100 OHM +-5% 1/8W
R5007	0100053	CF 330 OHM +-5% 1/8W
R5008	0100053	CF 330 OHM +-5% 1/8W
R5009	0100053	CF 330 OHM +-5% 1/8W
R501	0100065	CF 1K OHM +-5% 1/8W
R5010	0100067	CF 1.2K OHM +-5% 1/8W
R5011	0100067	CF 1.2K OHM +-5% 1/8W
R5012	0100067	CF 1.2K OHM +-5% 1/8W
R5013	0100082	CF 5.1K OHM +-5% 1/8W
R5014	0100065	CF 1K OHM +-5% 1/8W
R5015	0100074	CF 2.4K OHM +-5% 1/8W
R5016	0100097	CF 22K OHM +-5% 1/8W
R5017	0100067	CF 1.2K OHM +-5% 1/8W
R5018	0100082	CF 5.1K OHM +-5% 1/8W
R5019	0100065	CF 1K OHM +-5% 1/8W
R502	0100113	CF 100K OHM +-5% 1/8W
R5020	0100074	CF 2.4K OHM +-5% 1/8W
R5022	0100089	CF 10K OHM +-5% 1/8W
R5023	0100075	CF 2.7K OHM +-5% 1/8W
R5024	0100089	CF 10K OHM +-5% 1/8W
R5025	0100089	CF 10K OHM +-5% 1/8W
R5026	0100089	CF 10K OHM +-5% 1/8W
R5027	0100097	CF 22K OHM +-5% 1/8W
R5028	0100089	CF 10K OHM +-5% 1/8W
R5029	0100061	CF 680 OHM +-5% 1/8W
R503	0100121	CF 220K OHM +-5% 1/8W
R5030	0100049	CF 220 OHM +-5% 1/8W
R5031	0100097	CF 22K OHM +-5% 1/8W
R5032	0100089	CF 10K OHM +-5% 1/8W
R5033	0100073	CF 2.2K OHM +-5% 1/8W
R5034	0100097	CF 22K OHM +-5% 1/8W
R5035	0150038	VR 10K OHM-B RS-8
R5036	0100089	CF 10K OHM +-5% 1/8W
R5037	0100097	CF 22K OHM +-5% 1/8W
R5038	0150038	VR 10K OHM-B RS-8
R5039	0100089	CF 10K OHM +-5% 1/8W
R504	0100079	CF 3.9K OHM +-5% 1/8W
R5040	0100053	CF 330 OHM +-5% 1/8W
R5044	0100053	CF 330 OHM +-5% 1/8W
R5048	0100053	CF 330 OHM +-5% 1/8W
R505	0150084	VR 50K OHM-B RS-8
R5052	0100049	CF 220 OHM +-5% 1/8W
R5053	0100041	CF 100 OHM +-5% 1/8W
R5054	0114145	CF 390 OHM +-5% 1/4W
R5058	0100049	CF 220 OHM +-5% 1/8W
R5059	0100049	CF 220 OHM +-5% 1/8W
R506	0100099	CF 27K OHM +-5% 1/8W
R5060	0100049	CF 220 OHM +-5% 1/8W
R5061	0100049	CF 220 OHM +-5% 1/8W
R5063	0100049	CF 220 OHM +-5% 1/8W
R5064	0100049	CF 220 OHM +-5% 1/8W
R5065	0100049	CF 220 OHM +-5% 1/8W
R5066	0100055	CF 390 OHM +-5% 1/8W
R5067	0100057	CF 470 OHM +-5% 1/8W
R5068	0100065	CF 1K OHM +-5% 1/8W
R5069	0100041	CF 100 OHM +-5% 1/8W
R5070	0100067	CF 1.2K OHM +-5% 1/8W
R5071	0100067	CF 1.2K OHM +-5% 1/8W
R5072	0100067	CF 1.2K OHM +-5% 1/8W
R5074	0150035	VR 1K OHM-B RS-8
R5076	0150035	VR 1K OHM-B RS-8

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SYMBOL NO.	PART NO.	DESCRIPTION	SYMBOL NO.	PART NO.	DESCRIPTION
R5078	0150035	VR 1K OHM-B RS-8	R614	0150034	VR 500 OHM-B RS-8
R5079	0100057	CF 470 OHM +-5% 1/8W	R615	0100045	CF 150 OHM +-5% 1/8W
R5080	0100057	CF 470 OHM +-5% 1/8W	R616	0113766	CF 4.7K OHM +-5% 1/2W
R5081	0100057	CF 470 OHM +-5% 1/8W	R617	0114173	CF 3.3K OHM +-5% 1/4W
R5082	0100073	CF 2.2K OHM +-5% 1/8W	R618	0100051	CF 270 OHM +-5% 1/8W
R5085	0100089	CF 10K OHM +-5% 1/8W	R619	0100089	CF 10K OHM +-5% 1/8W
R5086	0100095	CF 18K OHM +-5% 1/8W	R620	0100080	CF 4.3K OHM +-5% 1/8W
R5087	0150038	VR 10K OHM-B RS-8	R621	0100053	CF 330 OHM +-5% 1/8W
R5088	0100095	CF 18K OHM +-5% 1/8W	R622	0100041	CF 100 OHM +-5% 1/8W
R5090	0150038	VR 10K OHM-B RS-8	R623	0100109	CF 68K OHM +-5% 1/8W
R5092	0100065	CF 1K OHM +-5% 1/8W	R624	0113725	CF 100 OHM +-5% 1/2W
R5093	0100079	CF 3.9K OHM +-5% 1/8W	R626	0100041	CF 100 OHM +-5% 1/8W
R5096	0100059	CF 560 OHM +-5% 1/8W	R627	0110101	MF 15 OHM +-5% 1W
R5097	0100059	CF 560 OHM +-5% 1/8W	R629	0113739	CF 390 OHM +-5% 1/2W
R5098	0100059	CF 560 OHM +-5% 1/8W	R630	0110166	MF 7.5K OHM +-5% 1W
R5099	0100049	CF 220 OHM +-5% 1/8W	⚠ R701	0110367	MF 8.2K OHM +-5% 3W
R510	0100067	CF 1.2K OHM +-5% 1/8W	⚠ R702	0100083	CF 5.6K OHM +-5% 1/8W
R5102	0100049	CF 220 OHM +-5% 1/8W	⚠ R703	0150037	VR 5K OHM-B RS-8
R5103	0100059	CF 560 OHM +-5% 1/8W	R704	0100109	CF 68K OHM +-5% 1/8W
R511	0100057	CF 470 OHM +-5% 1/8W	R705	0100085	CF 6.8K OHM +-5% 1/8W
R512	0150040	VR 50K OHM-B RS-8	R706	0100033	CF 47 OHM +-5% 1/8W
R513	0100120	CF 200K OHM +-5% 1/8W	⚠ R707	0100083	CF 5.6K OHM +-5% 1/8W
R514	0100062	CF 750 OHM +-5% 1/8W	R708	0113785	CF 27K OHM +-5% 1/2W
R515	0100069	CF 1.5K OHM +-5% 1/8W	R709A	0110351	MF 1.8K OHM +-5% 3W
R516	0100073	CF 2.2K OHM +-5% 1/8W	R709B	0110351	MF 1.8K OHM +-5% 3W
R517	0100084	CF 6.2K OHM +-5% 1/8W	R710	0100075	CF 2.7K OHM +-5% 1/8W
R518	0100089	CF 10K OHM +-5% 1/8W	⚠ R711	0119505	FR 2.2 OHM +-5% 1/4W
R519	0100089	CF 10K OHM +-5% 1/8W	⚠ R712	0119512	MF 1 OHM +-5% 1/4W
R523	0100083	CF 5.6K OHM +-5% 1/8W	⚠ R713	0119514	FR 10 OHM +-5% 1/4W
R524	0100079	CF 3.9K OHM +-5% 1/8W	R715	0113795	CF 68K OHM +-5% 1/2W
R525	0100079	CF 3.9K OHM +-5% 1/8W	R716	0113772	CF 8.2K OHM +-5% 1/2W
R526	0100079	CF 3.9K OHM +-5% 1/8W	R717	0110229	MF 220 OHM +-5% 2W
R527	0100053	CF 330 OHM +-5% 1/8W	⚠ R718	0119505	FR 2.2 OHM +-5% 1/4W
R528	0100053	CF 330 OHM +-5% 1/8W	⚠ R721	0113762	CF 3.3K OHM +-5% 1/2W
R529	0100053	CF 330 OHM +-5% 1/8W	R722	0113748	CF 820 OHM+-5% 1/2W
R551	0100083	CF 5.6K OHM +-5% 1/8W	R723	0100071	CF 1.8K OHM +-5% 1/8W
R601	0100047	CF 180 OHM +-5% 1/8W	R725	0113774	CF 10K OHM +-5% 1/2W
R602	0100047	CF 180 OHM +-5% 1/8W	R726	0141071	WW 4.7 OHM +-5% 6W
R603	0100087	CF 8.2K OHM +-5% 1/8W	R732	0110145	MF 1K OHM +-5% 1W
R604	0100097	CF 22K OHM +-5% 1/8W	⚠ R734	0119512	MF 1 OHM +-5% 1W
R605A	0111772	MF 680 OHM +-5% 5W	⚠ R735	0100047	CF 180 OHM +-5% 1/8W
R605B	0110345	MF 1K OHM +-5% 3W	R736	0100093	CF 15K OHM +-5% 1/8W
R606	0113761	CF 3K OHM +-5% 1/2W	⚠ R737	0100080	CF 4.3K OHM +-5% 1/8W
R607	0114041	CF 10 OHM +-5% 1/4W	⚠ R738	0113787	CF 33K OHM +-5% 1/2W
R608	0100065	CF 1K OHM +-5% 1/8W	⚠ R739	0119632	FR 11K OHM +-1% 1/8W
R609	0113761	CF 3K OHM +-5% 1/2W	R741	0114133	CF 120 OHM +-5% 1/4W
R610	0100092	CF 13K OHM +-5% 1/8W	R751	0100049	CF 220 OHM +-5% 1/8W
R611	0100073	CF 2.2K OHM +-5% 1/8W	R752	0100049	CF 220 OHM +-5% 1/8W
R612	0100092	CF 13K OHM +-5% 1/8W	R753	0100049	CF 220 OHM +-5% 1/8W
R613	0114014	CF 7.5 OHM +-5% 1/4W	R754	0100049	CF 220 OHM +-5% 1/8W

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SYMBOL NO.	PART NO.	DESCRIPTION
R755	0100049	CF 220 OHM +-5% 1/8W
R756	0100049	CF 220 OHM +-5% 1/8W
R757	0100049	CF 220 OHM +-5% 1/8W
! R760	0114201	CF 10K OHM +-5% 1/4W
R850	0100043	CF 120 OHM +-5% 1/8W
R852	0100067	CF 1.2K OHM +-5% 1/8W
R853	0151716	VR 5K OHM-B RV-8
R854	0100050	CF 240 OHM +-5% 1/8W
R856	0150001	VR 200 OHM-B
R858	0100067	CF 1.2K OHM +-5% 1/8W
R859	0151716	VR 5K OHM-B RV-8
R860	0100043	CF 120 OHM +-5% 1/8W
R862	0150001	VR 200 OHM-B
R864	0100067	CF 1.2K OHM +-5% 1/8W
R865	0151716	VR 5K OHM-B RV-8
R867	0113754	CF 1.5K OHM +-5% 1/2W
R868	0113760	CF 2.7K OHM +-5% 1/2W
R869	0113754	CF 1.5K OHM +-5% 1/2W
R877	0110271	MF 12K OHM +-5% 2W
R878	0110271	MF 12K OHM +-5% 2W
R879	0110271	MF 12K OHM +-5% 2W
⚠ R902	0141095	WW 1.5 OHM 8W
⚠ R903	0141102	WW 1.2 OHM 6W
R904	0113786	CF 30K OHM +-5% 1/2W
R905	0113786	CF 30K OHM +-5% 1/2W
⚠ R906	0110326	MF 160 OHM+-5% 3W
R908	0100107	CF 56K OHM +-5% 1/8W
R909	0100090	CF 11K OHM +-5% 1/8W
R910	0100065	CF 1K OHM +-5% 1/8W
R911	0110119	MF 82 OHM +-5% 1W
R912	0100081	CF 4.7K OHM +-5% 1/8W
R913	0110271	MF 12K OHM +-5% 2W
! R914	0100071	CF 1.8K OHM +-5% 1/8W
! R915	0119647	FR 47K OHM +-1% 1/8W
R916	0114153	CF 820 OHM +-5% 1/4W
! R917	0100077	CF 3.3K OHM +-5% 1/8W
! R918	0119647	FR 47K OHM +-1% 1/8W
R919	0100113	CF 100K OHM +-5% 1/8W
R921	0100104	CF 43K OHM +-5% 1/8W
R922	0100089	CF 10K OHM +-5% 1/8W
R923	0100077	CF 3.3K OHM +-5% 1/8W
! R924	0100065	CF 1K OHM +-5% 1/8W
⚠ R925	0119602	FR 620 OHM +-1% 1/8W
⚠ R926	0150034	VR 500 OHM-B RS-8
⚠ R927	0100041	CF 100 OHM +-5% 1/8W
⚠ R928	0113791	CF 47K OHM +-5% 1/2W
R929	0100091	CF 12K OHM +-5% 1/8W
! R930	0100094	CF 16K OHM +-5% 1/8W
R932	0114213	CF 33K OHM +-5% 1/4W
R933	0100075	CF 2.7K OHM +-5% 1/8W
R934	0113754	CF 1.5K OHM +-5% 1/2W
R935	0100081	CF 4.7K OHM +-5% 1/8W
R936	0110218	MF 75 OHM +-5% 2W
⚠ R937	0119505	FR 2.2 OHM +-5% 1/4W
R938	0137574	CF 910 OHM +-5% 1/4W
R941	0100061	CF 680 OHM +-5% 1/8W
R942	0100055	CF 390 OHM +-5% 1/8W
R943	0100129	CF 470K OHM +-5% 1/8W
R947	0110337	MF 470 OHM +-5% 3W
R949	0100041	CF 100 OHM +-5% 1/8W
⚠ R956	0139015	CC 1M OHM +-10% 1/2W
R957	0110339	MF 560 OHM +-5% 3W
⚠ R959	0119505	FR 2.2 OHM +-5% 1/4W
! R961	0119598	FR 430 OHM +-1% 1/8W
R962	0114131	CF 100 OHM +-10% 1/4W
R963	0114131	CF 100 OHM +-10% 1/4W
R965	0141102	UW 1.2 OHM +-5% 8W

ICs

IC201	2368282	IC M51354AP
IC501	2365062	IC HA11436A
⚠ IC701	2364181	IC HA11423
IC702	2363191	IC HD14006BP
⚠ IC901	2366721	IC UPC1394C
I0001	2362492	IC HD43019A
I0101	2366631	IC AN5020
I0201	2368292	IC MN1414HF
I0202	2368451	IC MN1228
I0203	2365411	IC UPC339C/TA75339P
I0204	2366621	IC LA7910
I0205	2366571	IC MN1217A
I3001	2368271	IC M51321P
I4001	2366392	IC AN5836
I5001	2367941	IC HD7407P
I5002	2368721	IC AN5352

TRANSISTORS

Q0001	2323352	TR 2SB642R/S
Q0002	2321984	TR 2SC2060(R)
Q0101	0573480	TR 2SC458B
Q0201	2324082	TR 2SK105(F)
Q0202	2320663	TR 2SC1213AC
Q0204	2320845	TR 2SC1162W (C)/(D)
Q0205	2320644	TR 2SC1213D
Q0208	2322191	TR 2SC1740(R)

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SYMBOL NO.	PART NO.	DESCRIPTION
Q0211	2320637	TR 2SA673C/D
Q0212	2320637	TR 2SA673C/D
Q0214	0573480	TR 2SC458B
Q0215	0573480	TR 2SC458B
Q0216	0573480	TR 2SC458B
Q0217	0573480	TR 2SC458B
Q0218	2322191	TR 2SC1740(R)
Q0219	2320637	TR 2SA673C/D
Q0220	2322191	TR 2SC1740(R)
Q0221	2320644	TR 2SC1213D
Q0222	2320637	TR 2SA673C/D
Q0226	0573480	TR 2SC458B
Q071	2320143	TR 2SC717TM
Q101	2321984	TR 2SC2060(R)
Q201	0573480	TR 2SC458B
Q223	2320637	TR 2SA673C/D
Q3001	2320644	TR 2SC1213D
Q3002	2321351	TR 2SA836/844 D/E
Q3003	2321351	TR 2SA836/844 D/E
Q3004	2320595	TR 2SC458D
Q3005	0573480	TR 2SC458B
Q3006	0573480	TR 2SC458B
Q305	0573480	TR 2SC458B
Q306	2320637	TR 2SA673C/D
Q307	0573480	TR 2SC458B
Q308	0573480	TR 2SC458B
Q351	0573480	TR 2SC458B
Q352	2321351	TR 2SA836/844 D/E
Q353	2320595	TR 2SC458D
Q354	0573480	TR 2SC458B
Q355	0573480	TR 2SC458B
Q356	2321351	TR 2SA836/844 D/E
Q357	2320595	TR 2SC458D
Q358	0573480	TR 2SC458B
Q4001	0573480	TR 2SC458B
Q4002	0573480	TR 2SC458B
Q4003	2320644	TR 2SC1213D
Q4004	2320644	TR 2SC1213D
Q4005	2320644	TR 2SC1213D
Q4008	2321351	TR 2SA836/844 D/E
Q4009	2320595	TR 2SC458D
Q401	0573480	TR 2SC458B
Q4010	2323432	TR 2SC1983R/O/Y
Q4011	2323432	TR 2SC1983R/O/Y
Q4012	0573480	TR 2SC458B
Q420	2321351	TR 2SA836/844 D/E
Q421	0573480	TR 2SC458B
Q423	2323432	TR 2SC1983R/O/Y
Q424	2323432	TR 2SC1983R/O/Y
Q5001	0573480	TR 2SC458B
Q5002	0573480	TR 2SC458B
Q5003	0573480	TR 2SC458B
Q5004	0573480	TR 2SC458B
Q5005	2321984	TR 2SC2060(R)
Q5006	0573480	TR 2SC458B
Q5007	0573480	TR 2SC458B
Q5014	2320637	TR 2SA673C/D
Q5016	0573480	TR 2SC458B
Q5018	0573480	TR 2SC458B
Q551	0573480	TR 2SC458B
Q601	2324471	TR 2SD1459Q/R
Q602	2324471	TR 2SD1459Q/R
⚠ Q701	2324322	TR 2SC2271/2SC2610-05
⚠ Q702	2324412	TR 2SD1455
Q851	2321221	TR 2SC1514
Q852	2321221	TR 2SC1514
Q853	2321221	TR 2SC1514
⚠ Q901	2323521	TR 2SD789(B/C)
⚠ Q902	2321591	TR 2SD401AK
Q904	2323432	TR 2SC1983R/O/Y
⚠ Q905	2324414	TR 2SD1455

DIODES

D0001	2332891	DI SE303A
D0002	2332891	DI SE303A
D0101	2332431	DI PH302
D0102	2331351	DI 1S2076/1S2473H
D0201	2331351	DI 1S2076/1S2473H
D0202	2331351	DI 1S2076/1S2473H
D0203	2331351	DI 1S2076/1S2473H
D0204	2331351	DI 1S2076/1S2473H
D0206	2331351	DI 1S2076/1S2473H
D0207	2331351	DI 1S2076/1S2473H
D0208	2331351	DI 1S2076/1S2473H
D0209	2331351	DI 1S2076/1S2473H
D0210	2331351	DI 1S2076/1S2473H
D0211	2331351	DI 1S2076/1S2473H
D0212	2331351	DI 1S2076/1S2473H
D0213	2331351	DI 1S2076/1S2473H
D0214	2331351	DI 1S2076/1S2473H
D0215	2331351	DI 1S2076/1S2473H
D0217	2331351	DI 1S2076/1S2473H
D0224	2331351	DI 1S2076/1S2473H
D0225	2331351	DI 1S2076/1S2473H
D0228	2331351	DI 1S2076/1S2473H
D0232	2331351	DI 1S2076/1S2473H
D0233	2331351	DI 1S2076/1S2473H
D0234	2331351	DI 1S2076/1S2473H
D0235	2331351	DI 1S2076/1S2473H

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SYMBOL NO.	PART NO.	DESCRIPTION
D0236	2331201	DI WO-6B
D0237	2331351	DI 1S2076/1S2473H
D0240	2331351	DI 1S2076/1S2473H
D0241	2331351	DI 1S2076/1S2473H
D0242	2331351	DI 1S2076/1S2473H
D0243	2331351	DI 1S2076/1S2473H
D0244	2331351	DI 1S2076/1S2473H
D0247	2331351	DI 1S2076/1S2473H
D3001	2331351	DI 1S2076/1S2473H
D3002	2331351	DI 1S2076/1S2473H
D3003	2331351	DI 1S2076/1S2473H
D3004	2331351	DI 1S2076/1S2473H
D3005	2331351	DI 1S2076/1S2473H
D3006	2331351	DI 1S2076/1S2473H
D3007	2331351	DI 1S2076/1S2473H
D3008	2331351	DI 1S2076/1S2473H
D3009	2331351	DI 1S2076/1S2473H
D301	2331351	DI 1S2076/1S2473H
D3010	2331351	DI 1S2076/1S2473H
D3011	2331351	DI 1S2076/1S2473H
D3012	2331351	DI 1S2076/1S2473H
D302	2331351	DI 1S2076/1S2473H
D303	2331351	DI 1S2076/1S2473H
D304	2331351	DI 1S2076/1S2473H
D351	2331351	DI 1S2076/1S2473H
D352	2331351	DI 1S2076/1S2473H
D353	2331351	DI 1S2076/1S2473H
D355	2331351	DI 1S2076/1S2473H
D4001	2331351	DI 1S2076/1S2473H
D4002	2331351	DI 1S2076/1S2473H
D4003	2331351	DI 1S2076/1S2473H
D4004	2331351	DI 1S2076/1S2473H
D4005	2331351	DI 1S2076/1S2473H
D4006	2331351	DI 1S2076/1S2473H
D4007	2331351	DI 1S2076/1S2473H
D4008	2331351	DI 1S2076/1S2473H
D4009	2331351	DI 1S2076/1S2473H
D4010	2331351	DI 1S2076/1S2473H
D4011	2331351	DI 1S2076/1S2473H
D4012	2331351	DI 1S2076/1S2473H
D4013	2331201	DI WO-6B
D4014	2331351	DI 1S2076/1S2473H
D4015	2331351	DI 1S2076/1S2473H
D420	2331201	DI WO-6B
D5001	2331351	DI 1S2076/1S2473H
D5002	2331351	DI 1S2076/1S2473H
D5003	2331351	DI 1S2076/1S2473H
D5004	2331351	DI 1S2076/1S2473H
D5005	2331351	DI 1S2076/1S2473H
D5006	2331351	DI 1S2076/1S2473H
D5007	2331351	DI 1S2076/1S2473H
D5008	2331351	DI 1S2076/1S2473H
D5009	2331351	DI 1S2076/1S2473H
D5010	2331351	DI 1S2076/1S2473H
D5011	2331351	DI 1S2076/1S2473H
D5012	2331351	DI 1S2076/1S2473H
D5013	2331351	DI 1S2076/1S2473H
D5014	2331351	DI 1S2076/1S2473H
D5015	2331351	DI 1S2076/1S2473H
D5016	2331351	DI 1S2076/1S2473H
D5017	2331351	DI 1S2076/1S2473H
D5018	2331351	DI 1S2076/1S2473H
D5019	2331351	DI 1S2076/1S2473H
D5020	2331351	DI 1S2076/1S2473H
D5021	2331351	DI 1S2076/1S2473H
D5023	2331351	DI 1S2076/1S2473H
D5024	2331351	DI 1S2076/1S2473H
D5025	2331351	DI 1S2076/1S2473H
D5026	2331351	DI 1S2076/1S2473H
D5027	2331351	DI 1S2076/1S2473H
D5028	2331351	DI 1S2076/1S2473H
D5029	2331351	DI 1S2076/1S2473H
D5030	2331351	DI 1S2076/1S2473H
D5031	2331351	DI 1S2076/1S2473H
D5032	2331351	DI 1S2076/1S2473H
D5033	2331351	DI 1S2076/1S2473H
D601	2330351	DI 1S2076
D602	2330351	DI 1S2076
D701	2332251	DI RH1S
D702	2332851	DI EH1Z
D703	2332141	DI RH1Z
D704	2332851	DI EH1Z
⚠ D705	2332851	DI EH1Z
D706	2330352	DI 1S2076A
D708	2331351	DI 1S2076/1S2473H
⚠ D901	2332794	DI RB-156 LFB
⚠ D902	2332251	DI RH1S
⚠ D903	2331201	DI WO-6B
⚠ D903	2333003	DI RU2AM
⚠ D904	2332242	DI RF1B
⚠ D905	2333003	DI RU2AM
D906	2331201	DI WO-6B
D907	2330564	DI V11N
⚠ D908	2332791	DI RB-151
D914	2331481	DI V06CS/SIB01-02
ZD101	2331495	ZD RD5.6EB
ZD201	2331001	ZD HZ6A
ZD301	2331161	ZD HZ11(A)/(B)/(C)
ZD302	2331161	ZD HZ11(A)/(B)/(C)
ZD501	2331154	ZD HZ12(A)/(B)/(C)

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SYMBOL NO.	PART NO.	DESCRIPTION
ZD502	2331154	ZD HZ12(A)/(B)/(C)
ZD503	2331154	ZD HZ12(A)/(B)/(C)
ZD701	2331161	ZD HZ11(A)/(B)/(C)
ZD702	2334303	ZD RD30EB2
⚠ ZD703	2335461	ZD HZ24L-2
ZD704	2331154	ZD HZ12(A)/(B)/(C)
ZD741	2331154	ZD HZ12(A)/(B)/(C)
ZD742	2331161	ZD HZ11(A)/(B)/(C)
ZD743	2331161	ZD HZ11(A)/(B)/(C)
⚠ ZD901	2331844	ZD HZ12(B)1
ZD904	2334243	ZD RD16EB2
⚠ ZD908	2334142	DI RD6.2EB1
Z0201	2334312	DI RD33EB1
Z0202	2331807	ZD HZ6(C)1
Z0203	2331821	ZD HZ9(A)1
Z0205	2334122	ZD RD5.1EB1
Z0208	2330633	ZD HZ7(C)
Z0212	2331497	ZD RD6.2EB
Z0214	2331154	ZD HZ12(A)/(B)/(C)
Z3001	2331161	ZD HZ11(A)/(B)/(C)
Z3002	2331161	ZD HZ11(A)/(B)/(C)
Z4001	2331161	ZD HZ11(A)/(B)/(C)
Z4002	2331161	ZD HZ11(A)/(B)/(C)
Z4003	2331161	ZD HZ11(A)/(B)/(C)
Z4004	2331161	ZD HZ11(A)/(B)/(C)
Z4005	2332483	ZD RD2.7EB1
Z4006	2332483	ZD RD2.7EB1
Z5001	2331807	ZD HZ6(C)1
Z5002	2331161	ZD HZ11(A)/(B)/(C)
Z5003	2331161	ZD HZ11(A)/(B)/(C)
Z5004	2331161	ZD HZ11(A)/(B)/(C)
Z5005	2331161	ZD HZ11(A)/(B)/(C)
Z5006	2331161	ZD HZ11(A)/(B)/(C)
Z5007	2331161	ZD HZ11(A)/(B)/(C)
Z5008	2331161	ZD HZ11(A)/(B)/(C)
Z5009	2331161	ZD HZ11(A)/(B)/(C)
Z5010	2331161	ZD HZ11(A)/(B)/(C)
Z5011	2331161	ZD HZ11(A)/(B)/(C)
Z5012	2331161	ZD HZ11(A)/(B)/(C)
Z5013	2331161	ZD HZ11(A)/(B)/(C)
Z5014	2331161	ZD HZ11(A)/(B)/(C)
Z5015	2331161	ZD HZ11(A)/(B)/(C)
THERMISTORS		
⚠ TH901	2340511	POSISTOR

SYMBOL NO.	PART NO.	DESCRIPTION
COILS		
L0101	2122253	LA AXIAL COIL
L0201	2121706	PEAKING COIL 100MI +-10%
L0208	2122234	LA AXIAL COIL
L0210	2120482	FILTER COIL 100MH 10%
L0212	2121706	PEAKING COIL 100MI +-10%
L0213	2121706	PEAKING COIL 100MI +-10%
L0214	2121706	PEAKING COIL 100MI +-10%
L0217	2122239	LA AXIAL COIL 10UH
L071	2141776	M7-D TYPE COIL
L072	2122253	LA AXIAL COIL
L101	2120482	FILTER COIL 100MH 10%
L202	2142661	S10-H MOLD IFT
L203	2122232	LA AXIAL COIL 2.7UH
L204	2142015	G TYPE MOLD IFT
L205	2142015	G TYPE MOLD IFT
L206	2122251	LA AXIAL COIL 68 MICROH
L207	2122242	LA AXIAL COIL 15UH
L208	2122241	LA AXIAL COIL 12UH
L209	2122253	LA AXIAL COIL
L210	2122253	LA AXIAL COIL
L3001	2122253	LA AXIAL COIL
L3002	2122253	LA AXIAL COIL
L3003	2120482	FILTER COIL 100MH 10%
L304	2122248	LA AXIAL COIL 47 MICROH
L305	2122248	LA AXIAL COIL 47 MICROH
L306	2122249	LA AXIAL COIL 56UH
L351	2141148	1H DL COIL
L352	2121706	PEAKING COIL 100MI +-10%
L353	2141148	1H DL COIL
L401	2122251	LA AXIAL COIL 68 MICROH
L402	2122253	LA AXIAL COIL
L5001	2122253	LA AXIAL COIL
L5002	2120482	FILTER COIL 100MH 10%
L501	2122241	LA AXIAL COIL 12UH
L502	2122241	LA AXIAL COIL 12UH
L503	2122241	LA AXIAL COIL 12UH
L701	2122093	FILTER COIL
⚠ L703	2160891	HORIZONTAL LINEARITY COIL
⚠ L706	2122095	FILTER COIL 24UH
L708	2120486	FILTER COIL 4700MI
L851	2122254	LA AXIAL COIL 120 UH
⚠ L901	2122741	FILTER COIL
⚠ L902	2121679	LINE FILTER COIL
L902	2163053	DEGAUSING COIL
L904	2120333	FILTER COIL
L905	2120481	FILTER COIL
L906	2120489	FILTER COIL
L907	2120489	FILTER COIL
L908	2120482	FILTER COIL 100MH 10%

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	DESCRIPTION
⚠ L910	2120482	FILTER COIL 100MH 10%
L911	2120481	FILTER COIL
L912	2120482	FILTER COIL 100MH 10%
L913	2120482	FILTER COIL 100MH 10%
L914	2120482	FILTER COIL 100MH 10%
⚠ L920	2122741	FILTER COIL
L711	2122241	LA AXIAL COIL 12UH
L712	2122241	LA AXIAL COIL 12UH
TRANSFORMERS		
T0101	2162012	COIL 38KHZ
T501	2141533	BAND PASS TRANSFORMER
⚠ T701	2433841	FLYBACK TRANSFORMER
T702	2260021	TRANS HORIZONTAL DRIVE
⚠ T703	2270186	PCT-H TRANSFORMER
⚠ T901	2211865	POWER TRANSFORMER
⚠ T901	2271292	SWITCHING TRANSFORMER
⚠ T902	2271301	DRIVE TRANSFORMER
⚠ T904	2213521	R/C POWER TRANSFORMER
COMPOUND COMPONENTS		
CP201	2300073	SAW FILTER HW2063
MF201	2142241	CERAMIC FILTER 4.5MHZ
MF401	2142601	CERAMIC FILTER 4.5MHZ
MF402	2790881	CERAMIC FILTER
M0001	2790841	CERAMIC FILTER CSB455EB
FUSES		
⚠ F901	2720587	FUSE 4A
MISCELLANEOUS		
DL351	2790901	1H DELAY LINE
DL352	2163292	DELAY LINE
RF	2664722	COAXIAL CABLE WITH PIN PLUG
⚠ RL901	2640282	POWER RELAY
SG851	2340037	SPARK GAP
SG901	2340037	SPARK GAP
SG902	2340037	SPARK GAP
SG903	2340037	SPARK GAP
SG904	2340037	SPARK GAP
⚠ SP451	2412071	SPEAKER 100X100MM
⚠ SP452	2412071	SPEAKER 100X100MM
S0201	2631722	KEY SWITCH
S0202	2631722	KEY SWITCH
S0203	2631722	KEY SWITCH
S0204	2631722	KEY SWITCH
S0205	2631722	KEY SWITCH
S0206	2631722	KEY SWITCH

SYMBOL NO.	PART NO.	DESCRIPTION
S0207	2631722	KEY SWITCH
S0208	2620671	SLIDE SWITCH
S0209	2631722	KEY SWITCH
S0211	2631722	KEY SWITCH
S0212	2631722	KEY SWITCH
S0222	2631722	KEY SWITCH
S0223	2631722	KEY SWITCH
S151	2630771	PUSH SWITCH
S4001	2620163	SLIDE SWITCH
⚠ V1	~~2354121~~ 2354502	CPT ~~A63AAT31X~~ A63AAT31X (HCPA OR HSCC MD)
X0201	2785302	CRYSTAL 4.5MHZ
X501	2790441	CRYSTAL
⚠	2425441	TUNER ET-449
⚠	2441084	DEFLECTION YOKE
	2582552	REMOTE CONTROL TRANSMITTER
	2658893	CPT SOCKET
	2660413	PLUG
	2661752	3P PIN PLUG WITH BASE
	2661753	PLUG
⚠	2742555	AC POWER CORD
	2771461	MAGNET
	2771831	C-F MAGNET
	2771892	FERRITE BEADS CORE 004
	2781282	BEAD BAND
	2781692	WASHER YD1A
	2781693	WASHER YD-1C
	2786281	MICA SHEET
	2786301	TRS SHEET
	2981231	INPUT OUTPUT TERMINAL BOARD
	3116801	CABINET ASS'Y (CT3000S)
	3116803	CABINET ASS'Y (CT3000W)
	3191095	FRONT GLASS (HCPA)
	3262442	KNOB-APS
	3265801	SELECT BUTTON
	3330941	EARTH SPRING
	3457083	BACK COVER ASS'Y (HCPA)
	3719342	CANOE RIVET
	3727702	PWB PLASTIC HOLDER
	3727972	HOLDER-AC LINE CORD
	3738321	PLASTIC FOOT ASS
	3763751	SK BINDER
	3771501	KNOB PRESET
	3772201	AC CORD HOLDER
	3778101	CORD CASE
	3778213	BATTERY LID
	3778221	REMOTE CONTROL FILTER
	3778492	R/C CASE (A)
	3779031	KNOB-CHANNEL

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	DESCRIPTION	SYMBOL NO.	PART NO.	DESCRIPTION
	3779041	VOLUME KNOB			
	3780091	PWB SPACER 81X			
	3781035	DOOR ASS'Y (CT3000S)			
	3781036	DOOR ASS'Y (CT3000W)			
	3781141	R/C CASE(B)			
	3781274	SIDE SPEAKER PANEL			
	4137974	4X12 TAPPING SCREW WITH WASHER			
	4137975	4X16 SELF-TAPPING SCREW WITH FLANGE			
	4159412	3X12 TAPPING SCREW			
	4159421	M3X8 TAPPING SCREW			
	4159423	M3X12 SCREW FOR RC PWB W/WASHER			
	4159424	3X10 SCREW			
	4159425	3X16 TAPPING SCREW			
	4260501	GLASS HOLDER			
	4263111	SPRING-SPEAKER PANEL			
	4280881	BATTERY TERMINAL (B-2)			
	4280891	BATTERY TERMINAL (C-2)			
	4514065	3X16 PAN HEAD SCREW WITH WASHER			
	4518372	SCREW-6X25MM			
	4518742	M2,3X12 PAN HEAD SCREW WITH WASHER			
	4518751	M2,3 NUT			
	4521451	M2,6 BIND SCREW			
	4614001	WEDGE			
	4614791	WEDGE			
	4616791	SWITCH GUM			
	4770772	3 NUT			
	2667054	IBM CORD - (RGB Cable - ONLY for hook-up W/IBM PC)			

3782371 - Top Side Holders.

HITACHI PARTS ORDERING INFORMATION

To receive original replacement parts, please contact your nearest HITACHI Parts Distributor or contact Hitachi Central Parts Warehouse listed below. Be sure to indicate part catalog number, part description and model number (located on back of product).

THE ELECTRONIC DISTRIBUTION CO.
1509 E. Del. Amo Blvd. Carson, CA. 90746
Phone #213-639-4120

TEL-VIDEO CORPORATION
1921 N. Milwaukee Avenue Chicago, ILL. 60647
Phone #312-235-6190

REMCOR ELECTRONICS
10670 W. 9 Mile Road Oak Park, MI. 48237
Phone #313-541-5666

VANCE BALDWIN, INC.
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Phone #305-693-2921

PANSON ELECTRONICS
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Phone #212-545-8888

TEE-VEE SUPPLY CO.
3211 Washington St. Jamaica Plain, MA. 02130
Phone #617-522-9330

MARTIN WHOLESALE, INC.
6 Terrace Shopping Center Richardson, Tx. 75081
Phone #214-231-1826

HARCO ELECTRONICS, INC.
Carsin Run Aberdeen, MD. 21001
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HITACHI SERVICE MANUALS

To order HITACHI Service Manuals contact:

HITACHI SALES CORPORATION OF AMERICA
Central Parts Warehouse 401 W. Artesia Blvd.
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For imformation concerning repairs, operation or technical assistance, please contact the Service Manager of the nearest Hitachi Regional Office, Service Division listed:

Southern Regional Office
510 Plaza Dr. College Park, GA 30349
Phone #404-763-0360

Mid-Western Regional Office
1400 Morse Avenue Elk Grove Village, IL 60007
Phone #312-593-1550

Eastern Regional Office
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Phone #201-935-8980

Western Regional Office
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Phone #213-537-8383

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Eastern Regional Office:	1200 Wall St. West, Lyndhurst, N.J 07071	Tel. 201-935-8980
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Southern Regional Office:	510 Plaza DR., College Park, Georgia 30349	Tel. 404-763-0360

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3219 Koapaka Street Honolulu, Hawaii 96819 Tel. 836-3621

HITACHI SALES CORPORATION DE PANAMA, S.A.

Apartado 7656, Panama 5, Calle Ramon Arias Y Calle B, Edificio Brasil 100,
Nuevo Reparto el Carmen, Republic de Panama Tel. 61-3100

Printed in Japan YM-TF (F)

CT3000S/CT3000W-511 YK No.940E YOKOHAMA
NTSC-SYSTEM NP83LX2 Chassis

HITACHI
SERVICE MANUAL

YK | No.895E·F

NP83X(A) Chassis

TECHNICAL INFORMATION

MODELS:	CT1930, CT1931, CT1933, CT1937, CT19Z3, CT19Z7

This NP83X(A) chassis edition shows "Discription of circuit", "Installation and alignment", "Troubleshooting", "Printed wiring board" and "Circuit diagram" When servicing each models as listed above, it is highly recommended to use not only this edition but also each model's service manual.

CONTENTS

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BASIC CIRCUIT DIAGRAMME 35

SOLID STATE COLOR TELEVISION

August 1983 **YOKOHAMA WORKS**

FEATURE OF NEW CHASSIS

1. **NEWLY DEVELOPED COMPONENTS**

(1) **IC M51354AP**
PIF/SIF IC.

(2) **TRANSISTOR: 2SD1453**
Horizontal output transistor with built-in diode.

(3) **TUNER: ET-446**
105 channels PLL tuner.

2. **NEW TUNING SYSTEM**
10 keys 105 channels direct tuning and UP/DOWN search tuning system.

3. **SIGNAL TRACKER(FOR U.S.A.)/COLOR COMMANDER (FOR CANADA)**
SIGNAL TRACKER/COLOR COMMANDER SYSTEM actually tracks the signal the instant it enters the COLOR TV, it automatically corrects color saturation and flesh tone errors.

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis or picture tube.

WARNING: Since the chassis of this receiver is connected to one side of AC power supply during operation, whenever the receiver is plugged in, service should not be attempted by anyone unfamiliar with the precautions necessary when working on this type of receiver.

The following precautions should be observed:

1. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep picture tube away from the body while handling.
2. When service is required, an isolation transformer should be inserted between power line and the receiver before any service is performed on a "HOT" chassis receiver.
3. When replacing a chassis in the receiver, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment cover-shields, isolation resistor-capacitor, etc.
4. When service is required, observe the original lead dress. Extra precaution should be taken to assure correct lead dress in the high voltage circuitry area.
5. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacture's. Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.
6. Before returning a serviced receiver to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the receiver by the manufacturer has become defective, or inadvertently defeated during servicing.

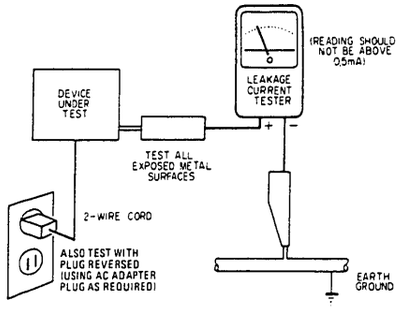
Therefore, the following checks should be performed for the continued protection of the customer and service technician.

Leakage Current Cold Check

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3MΩ and a maximum resistor reading of 5MΩ. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a AC120V, 60Hz outlet (do not use an isolation transformer for this check). Turn the AC power switch on. Using a "leakage Current Tester (Simpson Model 229 equvalent)", Measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly any exposed metal part having a return path to the chassis, to a known earth ground (water pipe, conduit, etc.). Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE RECEIVER TO THE CUSTOMER.

High Voltage

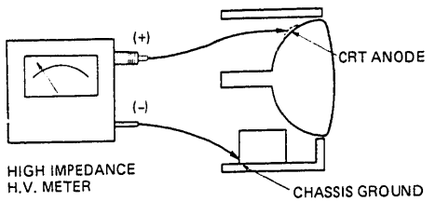
This receiver is provided with a hold down circuit for clearly indicating that voltage has increased in excess of a predetermined value. Comply with all notes described in this Service Manual regarding this hold down circuit when servicing, so that this hold down circuit may correctly be operated.

Serviceman warning

With minimum Brightness and Picture, operating high voltage in this receiver is lower than 31.0KV. In case any component having influence on high voltage is replaced, confirm that high voltage with minimum Brightness and Picture is lower than 31.0KV.

To measure H.V. use a high impedance H.V. meter. Connect (–) to chassis earth and (+) to the CRT anode button. (See the following connection diagram).

NOTE: Turn power switch off without fail before the connection with Anode button is made.



X-radiation

TUBE: The primary source of X radiation in this receiver is the picture tube. The tube utilized for the above mentioned function in this chassis is specially constructed to limit X radiation emissions.

For continued X radiation protection, the replacement tube must be the same type as the original, HITACHI approved type.

When trouble shooting and making test measurements in a receiver with a problem of excessive high voltage, avoid being unnecessarily close to the picture tube and the high voltage component.

Do not operate the chassis longer than is necessary to locate the cause excessive voltage.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in HITACHI television receiver have special safety related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by making with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, X-radiation, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

TECHNICAL CAUTIONS

[CHECK OF HIGH VOLTAGE HOLD DOWN CIRCUIT]

Checking of the high voltage hold down circuit operation

1. Turn the switch of the set OFF.
2. Connect a high voltage voltmeter between the CRT anode and the chassis ground (K3) as shown in Fig. 1.
3. Short circuit between the R605 (B+) and R902 using a jumper wire as shown in Fig. 2.
4. Set Brightness/Picture controls to max.
5. Turn the switch of the set ON after setting the AC input voltage to 0V, and then gradually increase the AC input voltage and check that the picture disappears when the high voltage is less than 31.0KV.
6. Turn the switch of the set OFF immediately after checking that the picture disappears.
7. Remove the adjusting jig and the voltmeter.

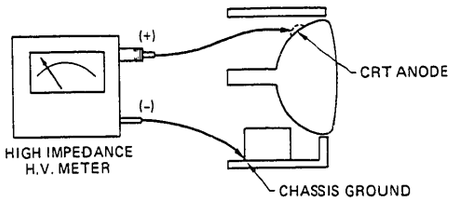


Fig. 1 Connection of H.V. Meter

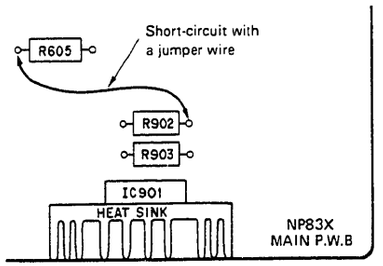


Fig. 2

CIRCUIT COMPOSITION (Differences from current NP81X chassis)

Circuit/Block		NP81X chassis	NP83X chassis
Block	Circuit		
Signal circuit	Antenna-circuit	Antenna terminal board with the immunity of direct wave radiation interference. (Improved small one) For ALL MODELS provided.	Same as NP81X chassis
	Tuner	ET-341 (12P, 16P model) ET-346 (CH91 PLL model) ET-436 (CH105 PLL model)	ET-446 (CH105 PLL)
	PIF circuit	SAW + PIF IC (HW2063) (HA11215A)	SAW + PIF/SIF IC (HW2063) (M51354AP)
	Chroma circuit	One chip IC (HA11436)	One chip IC (HA11436A)
	Video circuit		
Deflection circuit	Vertical/horizontal OSC and drive circuit	Deflection IC (HA11423)	Same as NP81X chassis
	Vertical output circuit	Discrete circuit (SRPP system)	
	Horizontal output circuit	Horizontal output transistor (2SD898B) (Damper diode is included).	Horizontal output transistor (2SD1453) (Damper diode is included).
	High voltage hold down circuit	High voltage limiter module	Discrete circuit
Power supply circuit		Power switch, single cut. IC regulator circuit (STR-384A)	Power switch, single cut. IC regulator circuit (STR-3035)
Channel selecting circuit		12P autopreset soft touch (CT19X3) 12P autopreset up/down (CT19X7) 16P autopreset soft touch (CT1914) 10 key PLL system (CT1915)	10 key PLL system
Additional functions	Remote control	Infrared ray 6 functions 22 functions 16 functions	Infrared ray 15 functions 17 functions
	Signal tracker Color commander	Automatic flesh tone correction and color saturation control	Same as NP81X chassis

DESCRIPTION OF NEW CIRCUIT

1. POWER SUPPLY CIRCUIT

This chassis uses the same series-control power supply circuit as the NP81X chassis. The difference from the NP81X chassis are as follows:

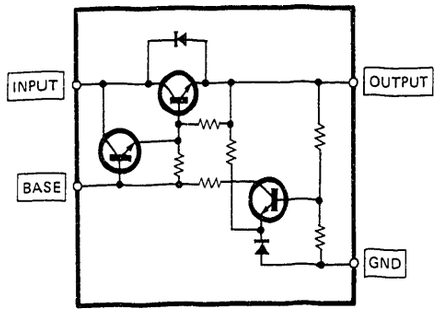
Regulator IC STR-3035 (IC901) is used in the constant voltage control section.

This IC is as same as STR-3035 used in NP82SX chassis and described in the following.

Fig. 5 shows the constant voltage control circuit of this chassis which uses the IC STR-3035, and Fig. 3 shows the internal circuit of the STR-3035, and the constant voltage control circuit of the NP81X chassis. Regulator IC STR-3035 is provided with all the functions including error detection, error amplification, etc. which were obtained from the transistors and voltage setting module, etc. in the conventional chassis; the rectified output voltage can be controlled to a constant voltage and output by principles entirely the same as those in the conventional series-control power circuit.

Fig. 4 shows the pin arrangement of STR-3035, and Table 1 shows the fundamental characteristics of this IC. The rectified output voltage is input between the GND terminal and the case shown in Fig. 3 and the output voltage (+B voltage = 135V) set to the constant voltage is output between the GND terminal and the OUTPUT terminal. That is, the rectifier output voltage is always applied to the IC case, so the IC is isolated from the heat-radiation fans.

F902 is a fuse which blows when over-current flows through IC901 and protects the circuit; the rating is specified so that the over-current does not exceed the over-load capacity of STR-3035 shown in Table 1.



STR-3035 Internal circuit diagram

Fig. 3

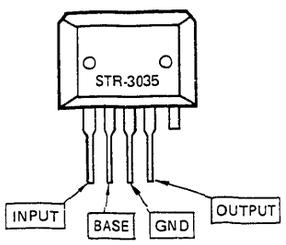


Fig. 4

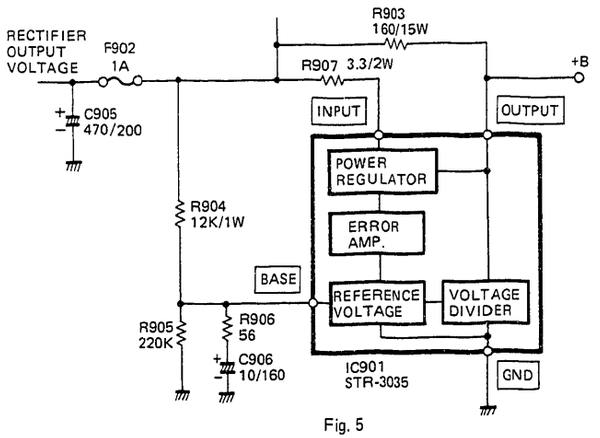


Fig. 5

Table 1. STR-3035 Fundamental Characteristics

Item No.	Item		Condition	Standard value
1	Max. rating	Input voltage	–	200V
		Output current	–	1.0A
		Max. power consumption	Tc 100°C	30W
2	Set output voltage		–	135V ± 1V
3	Output voltage regulation	Against input voltage	VAC ± 10%, Io 0.5A	± 1V
		Against output current	Io 0.25 – 0.5A	± 1V
4	Overload capacity		VCE 100V, Io 1.0A	1.0 sec (Min.)

Where, Tc : Temperature of case
Io : Output current
VCE : Voltage between Input and Output
VAC : AC commercial power supply voltage

It is almost the same as the NP81X chassis power circuit in other points; the by-pass resistor which reduces loss of IC901 is resistor R903 (160/15W).

The power switch is a single-cut switch.

2. DEFLECTION CIRCUIT

The deflection circuit is basically the same as that in the NP81X chassis.

3. REMOTE CONTROL POWER SUPPLY CIRCUIT

The series-control power supply circuit is used in this chassis as remote control power supply circuit, and the operation is the same as conventional series-control power supply circuit, and also this is used in the same way as "ON INITIAL" in the NP81X chassis.

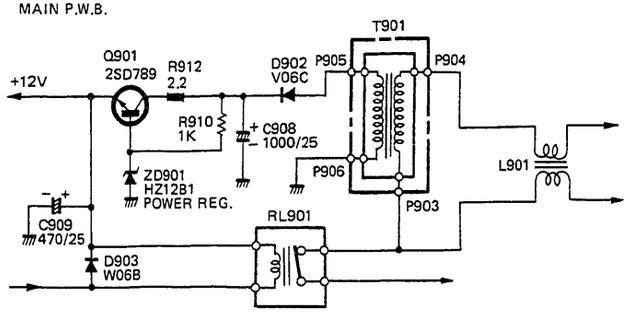


Fig. 6

4. TUNER

TUNER used in NP83X(A) chassis is shown as in Table 2.

Table 2

Models	ET-446 (for 105 CH PLL tuning)	HT-457B/HU-424 (for 2-knob tuning)
	CT1933, CT1937	CT1930
Antenna impedance	300Ω balance UHF 75Ω coaxial VHF/CATV	300Ω balance UHF 75Ω coaxial VHF
Receiving channel	2–13 (VHF) 14–83 (UHF) A–I (CATV, MID) J–W (CATV, SUPER)	2–13 (VHF) 14–83 (UHF)
	Total 105 CH	Total 82 CH

4-1 ET-446 (ET-Tuner)

The ET-446 is a PLL synthesizer tuner which can receive VHF 2–13CH, CATV A–WCH, UHF 14–83CH, a total of 105 chs the same as ET-345C, but it differs in the following points.

(1) A prescaler which divides the tuner local oscillation signal for the PLL synthesizer is provided.
(2) It is more compact and light-weight.

4-2 HT-457B/HU-424 (Mechanical Tuner)

Same as NP81X chassis.

5. PIF CIRCUIT

5-1 SAW Filter (CP201)

The saw filter HW2063 is the same as NP81X chassis. Please refer to the TECHNICAL INFORMATION of NP81X chassis (No. 750E).

6. PIF/SIF CIRCUIT

1 chip IC is used for the PIF/SIF circuit the same as in the NP82SX chassis.

The PIF/SIF IC M51354AP used is approximately the same as M51355 used in the NP82SX; refer to the NP82SX service manual (No. 820E) for details.

Differences between M51354AP and M51355 are as follows.

(1) The tuner AGC output is the reverse type in M51354AP.
(2) The SIF detector circuit of M51354AP is changed from the conventional peak differential system to the quadrature system, and the discriminator is a ceramic discriminator and no adjustment is required.

7. VIDEO/CHROMA CIRCUIT

The functions of the video/chroma IC HA11436A are the same as those of HA11436 used in the NP81X chassis. Refer to the NP81X chassis service manual (No. 750E) for details.

Some of the operational functions of the automatic color saturation control circuit built in HA11436A differs from those of HA11436; these are described here.

8. AUTOMATIC COLOR SATURATION CONTROL CIRCUIT

The function of the color saturation control circuit of HA11436A is to supress unevenness of the color saturation signal caused by unevenness of the transmission signal the same as in HA11436.

The following phenomena occur in the conventional HA11436 during Auto Flesh Switch ON, and the control characteristics are made gradual in HA11436A to improve its performance.

(1) Color saturation is not raised much in areas with very dense color.
(2) When the color saturation is raised, it becomes too dense in areas with weak color.

The difference between the color saturation control circuits of HA11436 and HA11436A: HA11436 operates the AGC using the peak detection system of the burst signal and chroma signal as shown in Fig. 7 and Fig. 8 to obtain flat characteristics as shown in Fig. 9, but HA-11436A feeds back the DC output detected by adding and averaging the B-Y and R-Y demodulation outputs to the color control pin to obtain the control voltage corresponding to the chroma output level. As a result, the demodulation output changes in a curve according to the change of the chroma level as shown in Fig. 9.

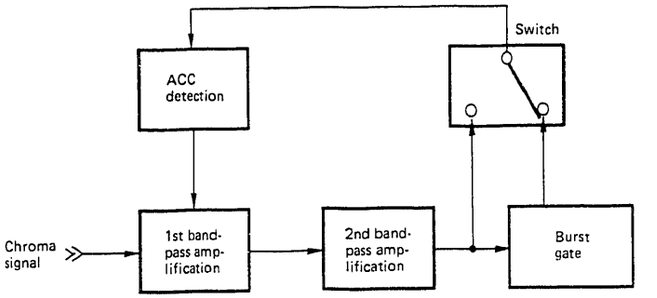


Fig. 7 HA11436 Block Diagram of Color Saturation Control Circuit

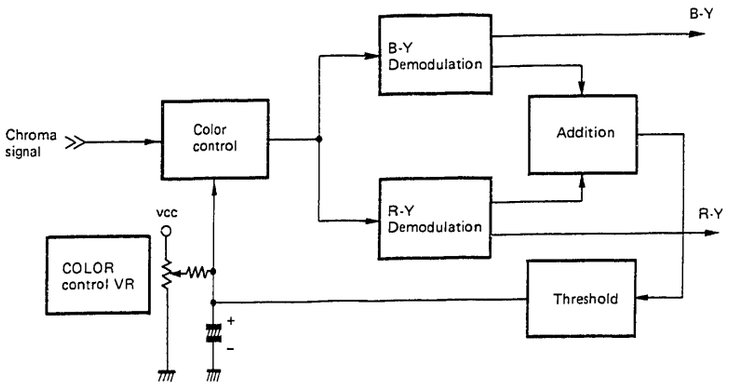


Fig. 8 HA11436A Block Diagram of Color Saturation Control Circuit

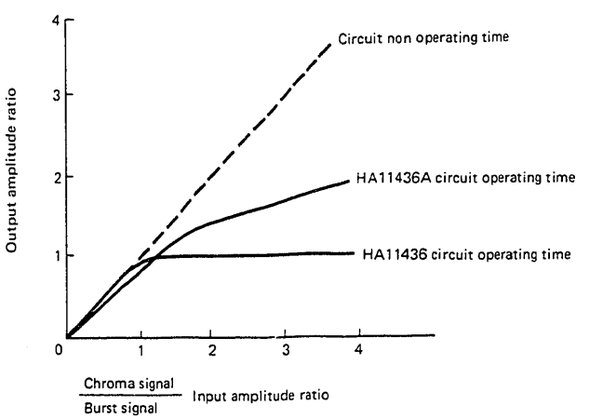


Fig. 9

9. PLL FREQUENCY SYNTHESIZER TUNING CIRCUIT

A 40 pins N channel MOS LSI is used for this tuning circuit, in which the PLL circuit and micro computer controller circuit are included. Functions of this IC are as follows.

(1) Set the count down ratio of programable counter.
(2) Key board input.
(3) Discriminator of television signal, signal offset and remote control signal.
(4) Control of CRT display.
(5) Control of band selector.

Fig. 10 shows the block diagram of this tuning system.

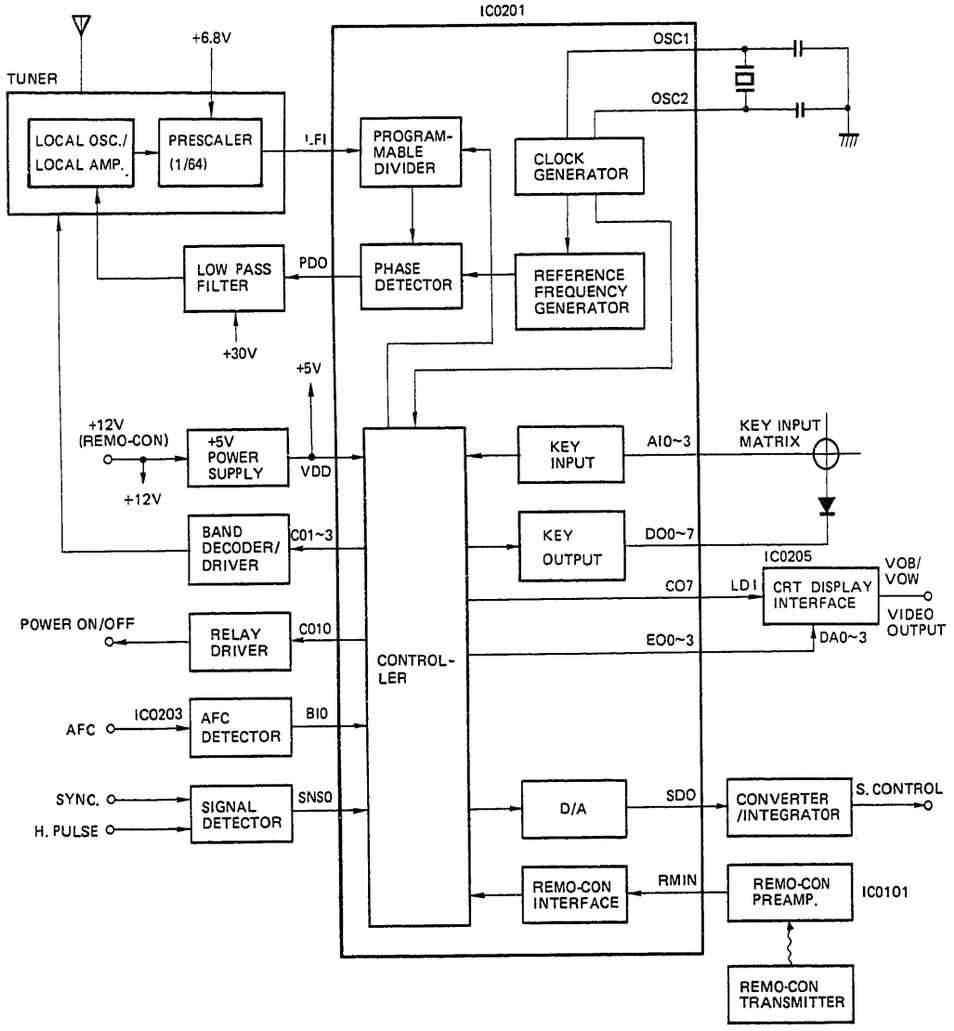


Fig. 10 Block Diagram of Tuning System

9-1 Band Drive Circuit

The band drive circuit selects and supplies 4 band select powers depending on the output condition (pin ③ – pin ⑤) of the band select signal output of IC0201; the power is supplied according to Table 3.

Table 4 shows the band select signal output condition of IC0201. Fig. 11 shows the band drive circuit.

Table 3. Tuner Band Voltage

Band / Terminal name of tuner band	VHF Low BAND (2–6 ch)	MID-BAND (A–I ch) VHF HIGH BAND (7–13 ch)	SUPER-BAND (J–W ch)	UHF BAND (14–83 ch)
BV	+12V	+12V	+12V	0
BU	0	0	0	+12V
BS1	-12V	+12V	+12V	+12V
BS2	-12V	-12V	+12V	-12V

Table 4. IC0201 Band Select Signal Output

Band / Output terminal	VHF Low BAND (2–6 ch)	MID-BAND (A–I ch) VHF HIGH BAND (7–13 ch)	SUPER-BAND (J–W ch)	UHF BAND (14–83 ch)
CO1 (③ pin)	Short	Short	Short	Open
CO2 (④ pin)	Open	Short	Short	Short
CO3 (⑤ pin)	Open	Open	Short	Open

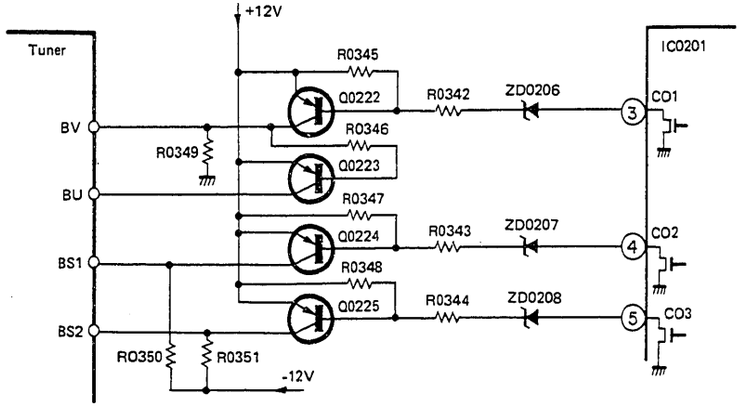


Fig. 11 Band Drive Circuit

9-2 CRT Display Circuit . . . Fig. 13

IC0205 is the interface IC to display the time and channel number.

The block diagram of IC0205 is shown in Fig. 12.

The data for the display is input from 4 parallel input terminal DA0 – DA3 (pin ③ – pin ⑥) and stored in the channel time memory of 10 words (1 word; 4 bit) and then, each word is displayed on screen after transformed into the figure or the english character through character generator.

Address setting to write the data into channel time memory is written by the positive edge of the input signal to LDI terminal (pin ②), and the data input is written by the negative edge of the input signal to LDI terminal.

VA1, VA2 terminal (⑭, ⑬ pin), HA1 and HA2 terminals (⑪, ⑩ pin) are for the adjustment of display place and it could be placed at 16 different places by setting these terminals H or L level.

In this circuit, each terminal is set at H level.

Next, each circuit operation is explained using Fig. 12.

HI terminal (⑫ pin) is the input terminal of horizontal sync. pulse, and VI terminal (⑮ pin) is the input terminal of vertical sync. pulse.

Integral circuit composed R0309, R0310 and C0224 are used to pick-up the vertical sync. pulse only from the vertical, horizontal composite signal.

Character and the background signal are put out from VOW terminal (⑯ pin) and VOB terminal (⑦ pin) respectivery.

Each signal is level shifted by Q0220 and Q0218, the character signal and the background signal are mixed and output by the circuit composed of Q0221 and Q0219. Output level is set at L level during character period at H level during background period and at floating level high impedance during no signal period.

A D0232 is used to cut off the background signal during character signal output period. C0233 and L0209 are used to correct the edge shape of background signal.

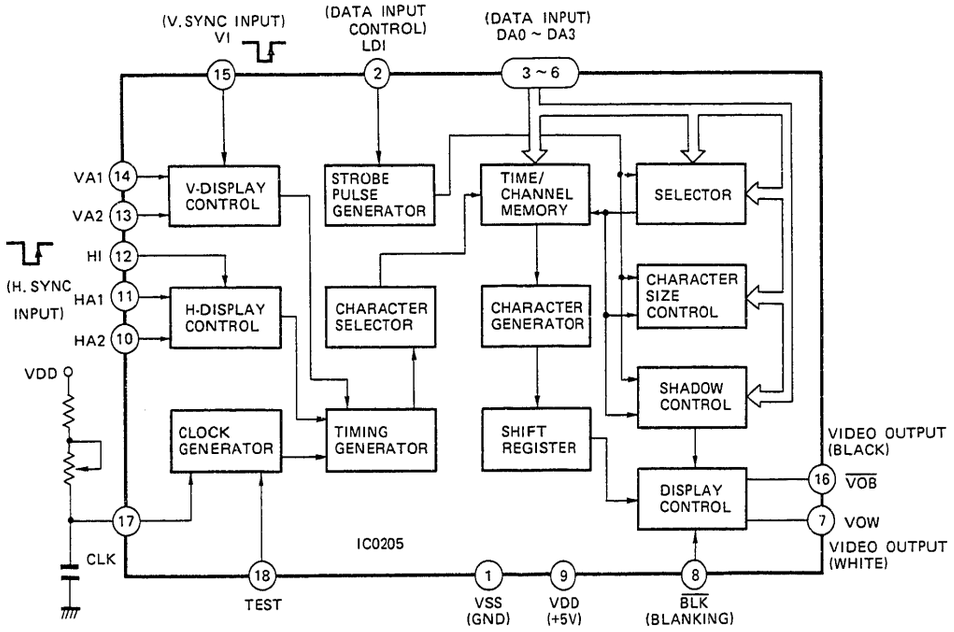


Fig. 12 Block Diagram of IC0205

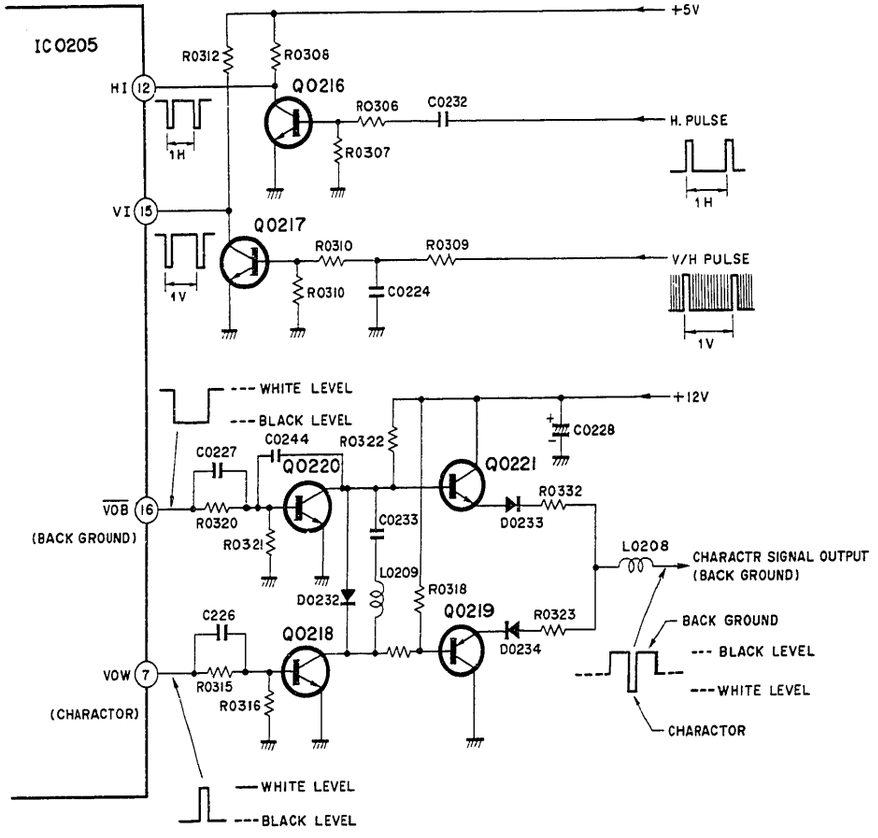


Fig. 13 C.R.T. Display Circuit

9.3 Signal Detection Circuit

The signal detection circuit detects whether or not a broadcast signal is present during channel selection; it is used to determine the variation direction of the frequency during the automatic fine tuning operation (AFC).

Fig. 14 shows the signal detection circuit.

When the sync signal is present (when a signal is present) with the same timing as the horizontal pulse, C0205 is charged synchronized by the sync signal via R0212, D0201, so the voltage at pin ⑤ becomes higher than the voltage produced by dividing the voltage of IC0203 pin ④, and pin ② is set to Lo. When the normal sync signal is not present (when the signal is not present), C0205 is discharged via R0210, so the voltage at IC203 pin ④ becomes lower than the voltage at pin ⑤, so pin ② is set to Hi.

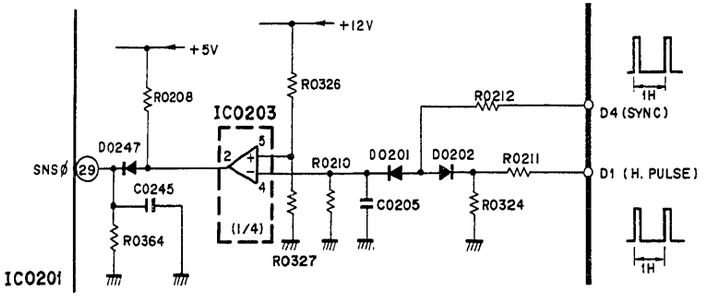


Fig. 14 Signal Detect Circuit

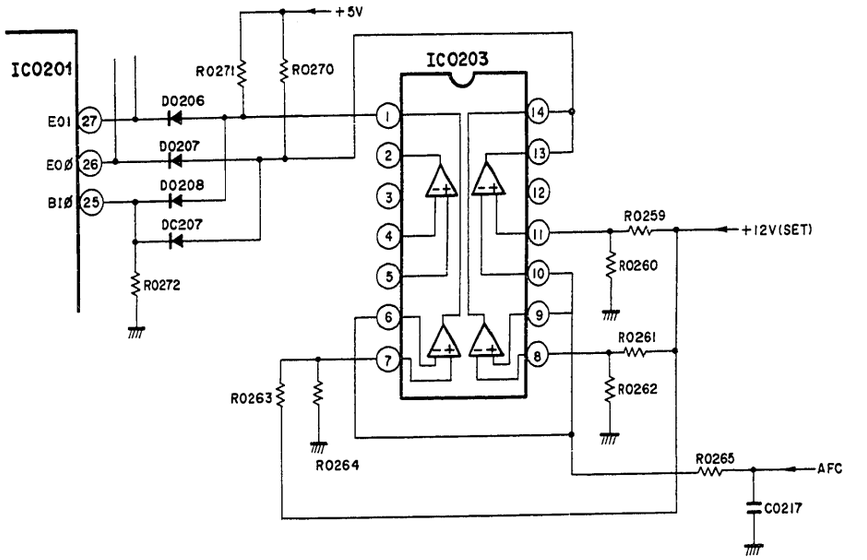


Fig. 15 AFC Detection Circuit

9.4 AFC Detection Circuit

Fig. 15 shows the AFC detection circuit and Fig. 16, the variation of the AFC output voltage tuning to the video intermediate frequency (45.75 MHz) fo.

When the AFC voltage is higher than the voltage (AFC – Hi) determined by the division ratio between R0259 and R0260, IC203 pin ⑬ is set to Lo, and when it is lower than the voltage (AFC – Lo) determined by the division ratio between R0261 and R0262, the pin ⑭ voltage is set to Lo.

When the AFC voltage is higher than the voltage (AFC – C level) determined by the division ratio between R0263 and R0264 pin ① is set to Lo.

The detection voltage (pin ① and pins ⑫, ⑭) produced by this detection circuit time-divides the AFC-H/L detection period and the AFC-C level detection period via the EO0 terminal (pin ⑯) and EO1 terminal (pin ㉗) and input it to the BI0 terminal (pin ㉕). The AFC operation is described using Fig. 17 next.

When a channel the desired frequency of which is higher than the previously programmed reception frequency is received (Fig. 17), the video intermediate frequency becomes lower than the reference frequency 45.75 MHz; assuming the frequency at that time as fo', the AFC voltage is set to point a. When the sync signal and the AFC voltage are detected first, and the sync signal is present and the AFC voltage is higher than the AFC-C level, the video intermediate frequency changed in the direction fo' → fo (making it higher) and when the AFC-C level (point b) and AFC-L level (point c) are detected, the frequency changes in the decreasing direction and stops at the middle between the AFC-H and AFC-C levels. In the same way, when the reception frequency is lower (Fig. 17), the AFC voltage is set to point a' assuming the video intermediate frequency as fo''. Here, no sync signal is present, and the AFC voltage is higher than the AFC-C level (or the sync signal is present and the AFC voltage is lower than the AFC-C level), the video intermediate frequency is changed in the direction so as to decrease fo'' → fo, and when the AFC-C level (poing b') and the AFC-H level (point c') are detected, the frequency changes in the increasing direction and stops at the middle between the AFC-H and AFC-L levels.

When the frequency stops once, it does not change regardless of the presence/absence of the sync signal and AFC voltage.

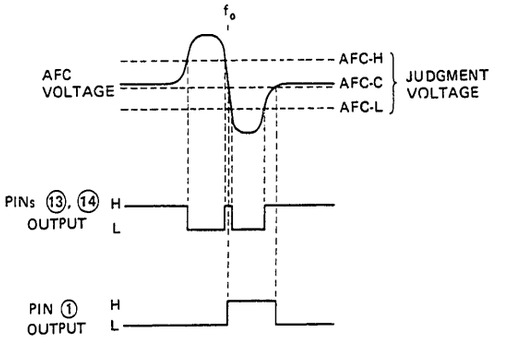


Fig. 16 AFC Detection Output Waveform

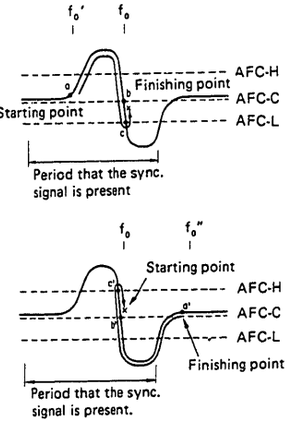


Fig. 17 AFC Operation

10. REMOTE CONTROL CIRCUIT (FOR CT1937, CT19Z7, A37)

10-1 Remote Control Transmitter

Fig. 18 shows the transmission signal of the remote control transmitter.

The pulse periods 2ms = "0", 4ms = "1" in Fig. 18 and the 4-bit leader section is always set to "0", "0", "0", "1" and the following 6-bit address section is encoded as shown in Table 5.

The 10-bit signal is transmitted twice and the continuous signal (4-bit) is transmitted repeatedly while the key is pressed.

Table 5

Key function	Code									
	A4	A3	A2	A1	D6	D5	D4	D3	D2	D1
Power ON/ OFF	0	0	0	1	0	1	0	1	0	0
Mute	0	0	0	1	0	1	0	1	0	1
Volume UP	0	0	0	1	0	1	0	1	1	0
Volume DOWN	0	0	0	1	0	1	1	0	1	0
9	0	0	0	1	0	0	1	0	0	1
8	0	0	0	1	0	0	1	0	0	0
7	0	0	0	1	0	0	0	1	1	1
6	0	0	0	1	0	0	0	1	1	0
5	0	0	0	1	0	0	0	1	0	1
4	0	0	0	1	0	0	0	1	0	0
3	0	0	0	1	0	0	0	0	1	1
2	0	0	0	1	0	0	0	0	1	0
1	0	0	0	1	0	0	0	0	0	1
0	0	0	0	1	0	0	0	0	0	0

10.2 Remote Control Reception Circuit

The remote control reception circuit is composed of the remote control pre-amp circuit which converts the infrared signal transmitted from the remote control transmitter to an electric signal and amplifies, detects this to demodulate the remote control signal, and the remote control processing circuit which decodes and processes the demodulated remote control signal.

The remote control processing circuit is built in the channel select IC (IC0201) described previously, so only the newly-employed remote control pre-amp circuit is described here.

Fig. 19 shows the remote control circuit block diagram.

The remote control pre-amp IC (IC0101) is composed of the remote control signal amplifier circuit and the shaper circuit; the remote control signal (40 kHz modulation wave) converted to the electric signal via the LED D0103 is amplified via AMP1 and AMP2 and output from pin ⑦. This signal is amplified via the tuned/amplifier circuit which is composed of Q0101 and T0101 and is tuned to 41 kHz and detected/demodulated via D0102 and C0108.

The demodulated signal is input to pin ⑥ and output from pin ④ as the signal (approx. 5 V^{RP}) with its noise removed by the shaper circuit and this signal is directly input to the channel select IC0201 pin ㉚. R0104 is the gain control resistor in the amplifier; the specified transmission distance is obtained by varying this resister.

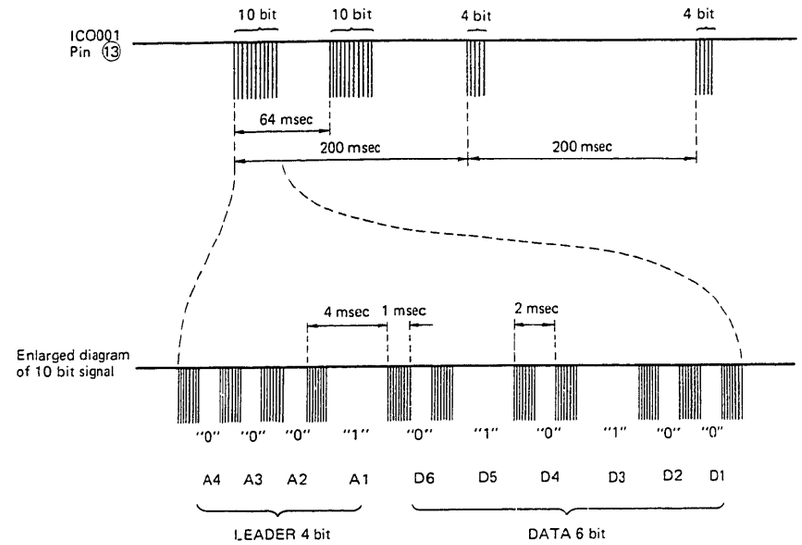


Fig. 18

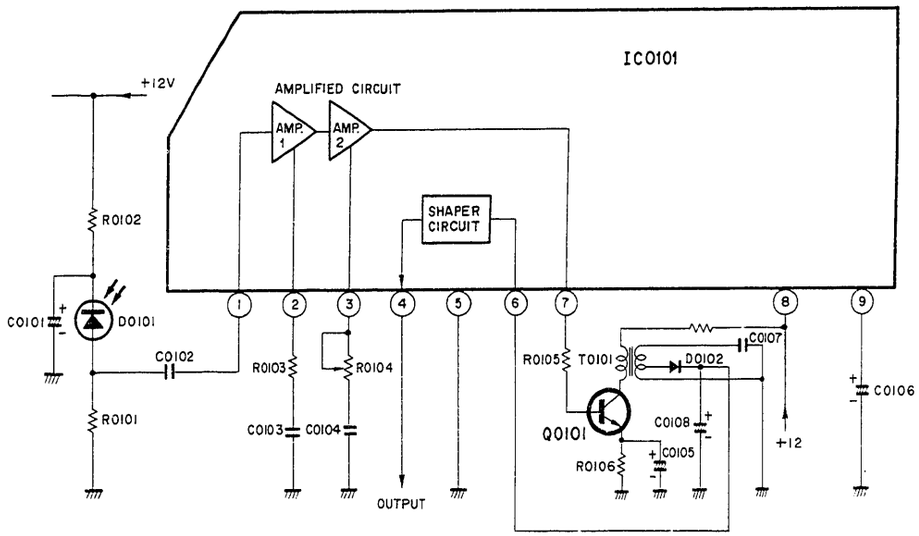
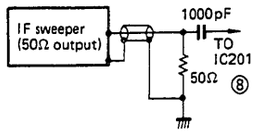
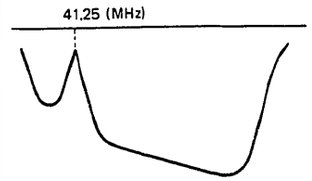


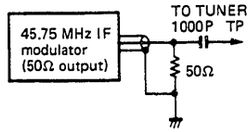
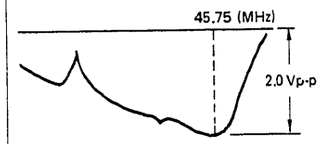
Fig. 19 Remote Control Pre Amp. Circuit

INSTALLATION AND ADJUSTMENT

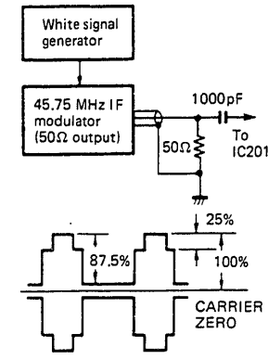
1. SOUND TRAP ADJUSTMENT

ADJUSTMENT PREPARATION	ADJUSTMENT PROCEDURE	REMARKS/WAVEFORM
(1) Connect the signal to IC201 ⑧ through the following jig.  (2) Connect the 0.001 μF between the pin ⑨ and ground. (3) Connect the oscilloscope to TP-12. (4) Apply +11.9V to B+. (5) Apply +5V to IC201 ② (AGC).	(1) Adjust L202 until the signal amplitude of 41.25 MHz on the oscilloscope is minimized. Fig. 20.	 Fig. 20

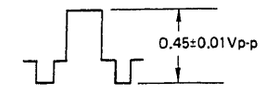
2. CARRIER FILTER

ADJUSTMENT PREPARATION	ADJUSTMENT PROCEDURE	REMARKS/WAVEFORM
(1) Apply the signal to the tuner TP through the following jig.  (2) Connect the oscilloscope to TP-12.	(1) Adjust the L204 till peak point of waveform becomes 45.75 MHz. Fig. 21.	 Fig. 21

3. AFC ADJUSTMENT

ADJUSTMENT PREPARATION	ADJUSTMENT PROCEDURE	REMARKS/WAVEFORM
(1) Apply the signal to the tuner TP through the following jig.  WAVEFORM OF OUTPUT SIGNAL OUTPUT LEVEL; 75 – 80 dBμ (0 dBμ = 1 μV) (2) Connect the DC voltmeter to R211 (S501 ON). . . . For mechanical tuner. Connect the DC voltmeter to R211 (A2 side). S501 ON. . . . For mechanical tuner. (3) Connect the DC voltmeter to R211 (IC201 pin ㉔ side) . . . For electronic tuner.	(1) Adjust the L205 until output voltage becomes. 2.5 ± 0.5V . . . For electronic tuner. 6.5 ± 0.5V . . . For mechanical tuner. (Adjust within the range in which the reading of the DC voltmeter changes rapidly between approx. 11V and 1V.)	

4. VIDEO LEVEL ADJUSTMENT

ADJUSTMENT PREPARATION	ADJUSTMENT PROCEDURE	REMARKS/WAVEFORM
(1) Connect on oscilloscope to R307.	(1) Adjust R307 to get 0.45 ± 0.01 Vp-p.	 Fig. 22

8-4 FOCUS ADJUSTMENT

(1) Receive the broadcast signal and set the brightness control to its click position and the picture control to maximum.
(2) Set the focus control so that focus at the center of the picture is best.

8-5 WHITE BALANCE ADJUSTMENT

(1) Adjustment preparation
  (a) Start the adjustment more than 10 min. after the power switch is turned on.
  (b) Turn off the APS switch.
  (c) Set the drive controls (R856 and R862) to the mechanical center positions.
  (d) Turn the low brightness white balance controls (R853, R859 and R865) fully counterclockwise.
  (e) Turn the screen control fully counterclockwise.
  (f) Disconnect P5.
  (g) Short-circuit the M3 and M4 terminals of the deflection yoke.
  (h) Set the picture control to the center position.
(2) Adjustment procedure
  (a) Gradually turn the screen control clockwise until a slight line appears on the CRT screen. If no line appears, turn this control fully clockwise.
  (b) Gradually turn the low brightness white balance control clockwise until three color lines, red, blue, and green, appear evenly on the CRT screen.
  (c) Remove the jumper from M3 and M4.
  (d) Insert P5 connector.
  (e) Turn the brightness and picture controls fully counterclockwise, and turn the sub-brightness control (R311) until a white raster appears slightly.
  (f) Turn the picture and brightness control to maximum position, and adjust the high brightness white balance with the drive controls (R856 and R862).
  (g) While turning the picture control, and confirm that the low brightness white balance is obtained.

8-6 SUB BRIGHTNESS ADJUSTMENT

(1) Adjustment preparation
  (a) Start the adjustment more than 10 min. after the power switch is turned on.
  (b) Turn off the APS switch (S501).
  (c) Turn the picture control (R308) and color control (R507) fully counterclockwise.
  (d) Set the brightness control (R321) to the mechanical center position.
(2) Adjustment procedure
  Gradually turn the sub brightness control (R312) until a black level on the CRT screen gose to black.

8-7 AGC ADJUSTMENT (R210)

(1) Preparation for adjustment
  (a) Apply heat-run for 5 minutes or more in the signal reception mode after all the adjustment is completed.
  (b) Receive the broadcast signal CH11 or CH12. (AFC ON)
  (c) Set the picture control to its mechanical center and the brightness control to its click position.
  (d) Antenna input level
    -53 dBm . . . . . Models using ET-446, HT-457B
    -58 dBm . . . . . Models using ET-446 (with booster)
  (e) Connect a DC voltmeter with internal resistance 1 MΩ or more as follows:
    Connect to main PWB TP-15 . . . . . Models using ET-446
    Connect to tuner AGC terminal . . . . . Models using HT-457B
(2) Adjustment procedure
  (a) Models using ET-446
    Turn R210 (AGC VR) to adjust so that the reading of the DC voltmeter is 7.3 ± 0.2V.
  (b) Model using HT-457B
    Turn R210 counterclockwise and stop it at the position where the reading of the DC voltmeter does not change. Assume the reading of the DC voltmeter at that time as V1. Next, turn R210 clockwise and stop it at the position where the reading of the DC voltmeter [V1 + (0.1 ± 0.05)1V.

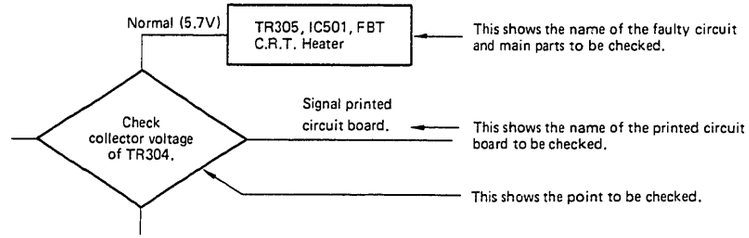
TROUBLESHOOTING

PRODUCT SAFETY NOTE

The shaded components have special characteristics important to safety.
Read carefully the product safety notice of each service manual. Don't degrade the safety of the receiver through improper servicing before replacing any these components.

How to use the flow chart

1. The flow chart shows the following.



2. The voltage shown in the chart may differ to some extent depending on the condition of the set and tester.

Precaution on making measurements and on handling

1. When any parts becomes abnormally hot or there is a smell of burning, cut off the power immediately.
2. Do not make shorts between circuits or across terminals except for those specified.
3. When applying a signal for checking purposes, make connection in the alternate current system for any not specified.
4. When measuring the voltages of ICs and TRs, be careful to see that the lead bar of the tester does not touch any other terminal.
5. Measure the voltage correctly.
6. Measure the resistance over a small range.
7. Be sure to switch off the power when replacing parts.
8. Do not apply a soldering iron for a long time when replacing parts. (Use a solder-wick)

8. FINAL ADJUSTMENT

8-1 PURITY ADJUSTMENT

(1) Adjustment preparation
  (a) Degauss the set.
  (b) Cause the deflection yoke to touch the CRT funnel closely.
  (c) Turn the receiver on, and receive a crosshatch signal and coarsely adjust the static convergence.
  (d) Turn the brightness and picture control fully clockwise.
  (e) Switch on the power supply to the TV set to warm it up. Wait more than 20 minutes before proceeding to make purity adjustment.

(2) Adjustment procedure
  (a) Short-circuit P3-Q852 (emitter) to set the picture to magenta, as shown in Fig. 27.

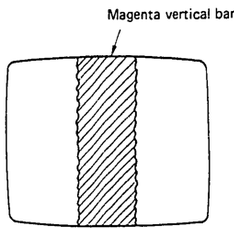


Fig. 27

  (b) Push the deflection yoke fully to the CRT funnel surface and turn the purity magnet until the magenta vertical band is positioned at the center of the picture.
  (c) Short-circuit P4-Q853 (emitter) to set the picture to red.
  (d) Gradually draw back the deflection yoke until both the uneven colors at the left and right of the picture disappear, and then mark the current position of rear edge of the deflection yoke on the tape wound onto the nect of CRT with a pencil or pen, as shown in Fig. 28. While drawing back the deflection yoke further, mark the rear edge position of the deflection yoke on the tape similarly, immediately before the uneven colors appear at the left and right of the picture.

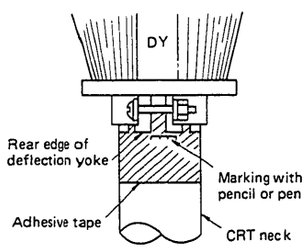


Fig. 28

  Adjust the deflection yoke position so that the its rear edge is positioned at the center of the two lines marked and fix the deflection yoke.
  (e) Further insert a rubber wedge from the top between the deflection yoke and CRT funnel, and thereby raise the deflection yoke upward.
  (f) Receiving crosshatch pattern tilt the deflection yoke so the indication of the vertical center line is the same as the CRT geometrical vertical center line.

8-2 STATIC CONVERGENCE ADJUSTMENT

(1) Adjustment preparation
  (a) Same as the preparation of purity adjustment.

(2) Adjustment procedure
  (a) Open the knobs of the two 4-pole magnets (Fig. 34), and make the blue and red vertical lines match with each other at the center of the picture, as shown in Fig. 29.
  (b) Turn the magnet while keeping the 4-pole magnets open (Fig. 35), and make the blue and red lateral lines match with each other, as shown in Fig. 30.
  (c) Open the knobs of the two 6-pole magnets, and make the green vertical line match with the blue and red vertical lines at the center of the picture, as shown in Fig. 31.
  (d) Turn the 6-pole magnets while keeping their knobs open, until the green lateral line matches with the blue and red lateral lines at the center of the picture as shown in Fig. 32.
  (e) Readjustment procedures in Item (1) through (4).

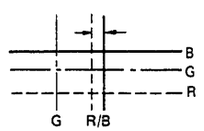


Fig. 29

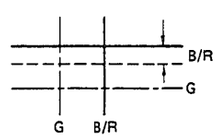


Fig. 30

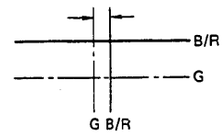


Fig. 31

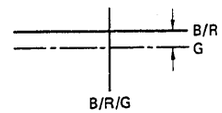


Fig. 32

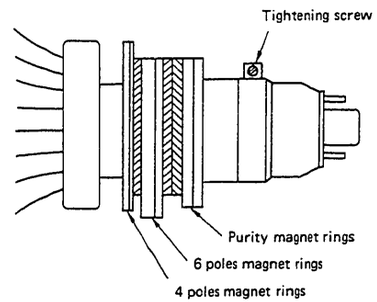


Fig. 33

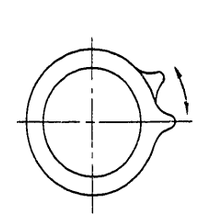


Fig. 34

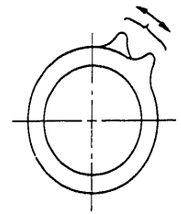


Fig. 35

8-3 DYNAMIC CONVERGENCE ADJUSTMENT

(1) Insert the adjustment wedge (temporarily) between just above the opening of DY and the CRT funnel as shown in Fig. 36, and gradually insert this wedge to match the red and blue vertical lines at the top of the picture and the red and blue horizontal lines at the left/right of the picture as shown in Fig. 37.

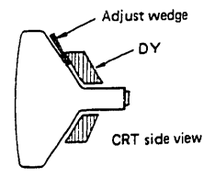


Fig. 36

(2) When blue color is outside the CRT picture than red color as shown in Fig. 37, insert the DY fixing wedge between the DY on the right viewed from the back of the CRT and CRT funnel.
(3) When blue is inside the red in the CRT picture as shown in Fig. 37, insert the DY fixing wedge between the DY on the right and the CRT funnel.
(4) Insert 2 DY fixing wedges so that they are 120° from each other with the DY fixing wedge inserted in Item (2) or (3), and fixed them together with the wedge inserted in Item (2) or (3) using tape and then remove the wedge temporarily inserted previously.

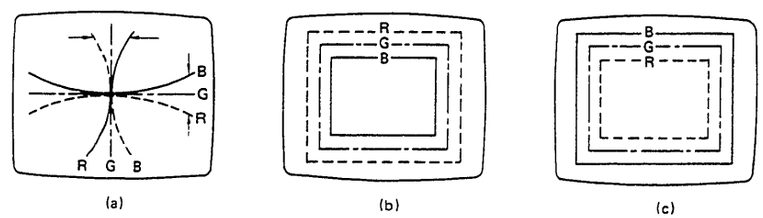


Fig. 37

8-4 FOCUS ADJUSTMENT

(1) Receive the broadcast signal and set the brightness control to its click position and the picture control to maximum.
(2) Set the focus control so that focus at the center of the picture is best.

8-5 WHITE BALANCE ADJUSTMENT

(1) Adjustment preparation
  (a) Start the adjustment more than 10 min. after the power switch is turned on.
  (b) Turn off the APS switch.
  (c) Set the drive controls (R856 and R862) to the mechanical center positions.
  (d) Turn the low brightness white balance controls (R853, R859 and R865) fully counterclockwise.
  (e) Turn the screen control fully counterclockwise.
  (f) Disconnect P5.
  (g) Short-circuit the M3 and M4 terminals of the deflection yoke.
  (h) Set the picture control to the center position.
(2) Adjustment procedure
  (a) Gradually turn the screen control clockwise until a slight line appears on the CRT screen. If no line appears, turn this control fully clockwise.
  (b) Gradually turn the low brightness white balance control clockwise until three color lines, red, blue, and green, appear evenly on the CRT screen.
  (c) Remove the jumper from M3 and M4.
  (d) Insert P5 connector.
  (e) Turn the brightness and picture controls fully counterclockwise, and turn the sub-brightness control (R311) until a white raster appears slightly.
  (f) Turn the picture and brightness control to maximum position, and adjust the high brightness white balance with the drive controls (R856 and R862).
  (g) While turning the picture control, and confirm that the low brightness white balance is obtained.

8-6 SUB BRIGHTNESS ADJUSTMENT

(1) Adjustment preparation
  (a) Start the adjustment more than 10 min. after the power switch is turned on.
  (b) Turn off the APS switch (S501).
  (c) Turn the picture control (R308) and color control (R507) fully counterclockwise.
  (d) Set the brightness control (R321) to the mechanical center position.
(2) Adjustment procedure
  Gradually turn the sub brightness control (R312) until a black level on the CRT screen gose to black.

8-7 AGC ADJUSTMENT (R210)

(1) Preparation for adjustment
  (a) Apply heat-run for 5 minutes or more in the signal reception mode after all the adjustment is completed.
  (b) Receive the broadcast signal CH11 or CH12. (AFC ON)
  (c) Set the picture control to its mechanical center and the brightness control to its click position.
  (d) Antenna input level
    -53 dBm . . . . . Models using ET-446, HT-457B
    -58 dBm . . . . . Models using ET-446 (with booster)
  (e) Connect a DC voltmeter with internal resistance 1 MΩ or more as follows:
    Connect to main PWB TP-15 . . . . . Models using ET-446
    Connect to tuner AGC terminal . . . . . Models using HT-457B
(2) Adjustment procedure
  (a) Models using ET-446
    Turn R210 (AGC VR) to adjust so that the reading of the DC voltmeter is 7.3 ± 0.2V.
  (b) Model using HT-457B
    Turn R210 counterclockwise and stop it at the position where the reading of the DC voltmeter does not change. Assume the reading of the DC voltmeter at that time as V1. Next, turn R210 clockwise and stop it at the position where the reading of the DC voltmeter [V1 + (0.1 ± 0.05)1V.

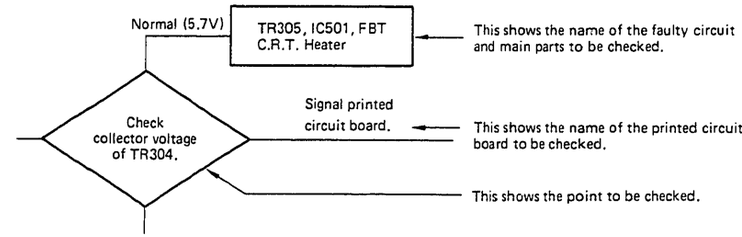
TROUBLESHOOTING

PRODUCT SAFETY NOTE

The shaded components have special characteristics important to safety.
Read carefully the product safety notice of each service manual. Don't degrade the safety of the receiver through improper servicing before replacing any these components.

How to use the flow chart

1. The flow chart shows the following.

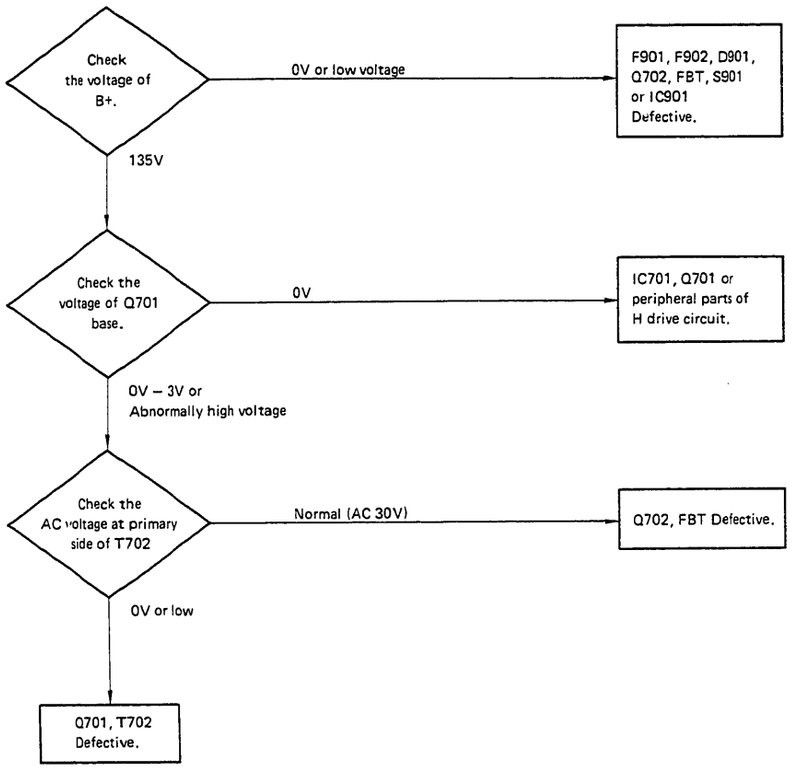


2. The voltage shown in the chart may differ to some extent depending on the condition of the set and tester.

Precaution on making measurements and on handling

1. When any parts becomes abnormally hot or there is a smell of burning, cut off the power immediately.
2. Do not make shorts between circuits or across terminals except for those specified.
3. When applying a signal for checking purposes, make connection in the alternate current system for any not specified.
4. When measuring the voltages of ICs and TRs, be careful to see that the lead bar of the tester does not touch any other terminal.
5. Measure the voltage correctly.
6. Measure the resistance over a small range.
7. Be sure to switch off the power when replacing parts.
8. Do not apply a soldering iron for a long time when replacing parts. (Use a solder-wick)

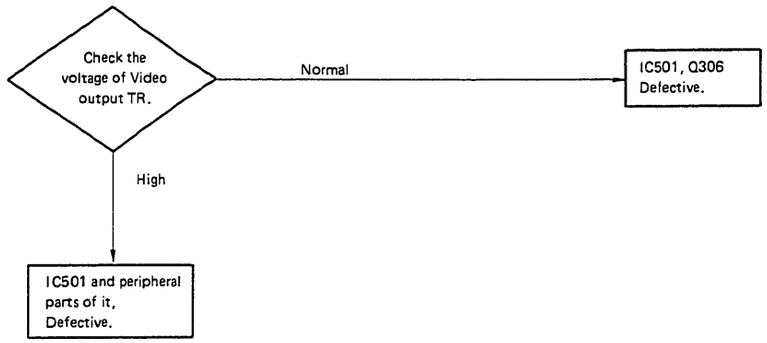
1. NO WORKING RASTER AND SOUND



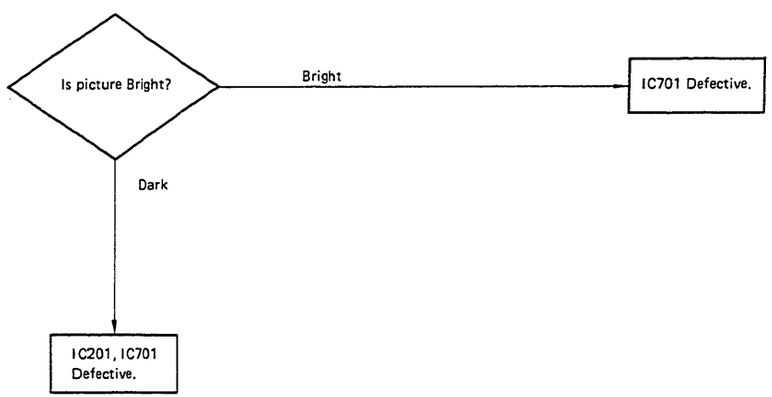
NOTE

CHANGE OF F902: After discharge the C905 ½connect the discharge resistor (300/3W) between C905 ⊕ side and C905 ⊖ side (GND)], change the new parts F902.

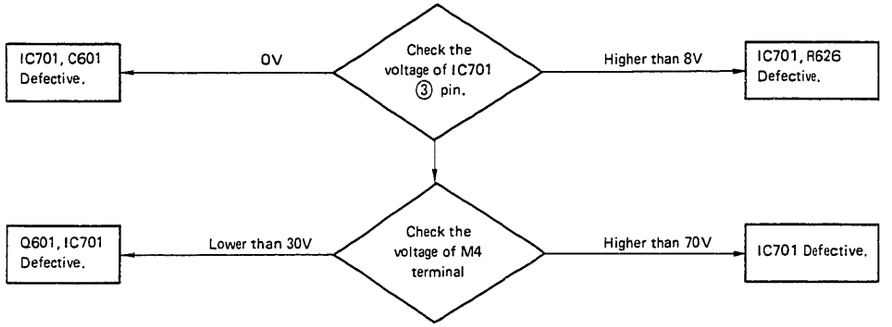
2. ONLY RASTER OR FLYBACK TRACE APPARENT ON PICTURE



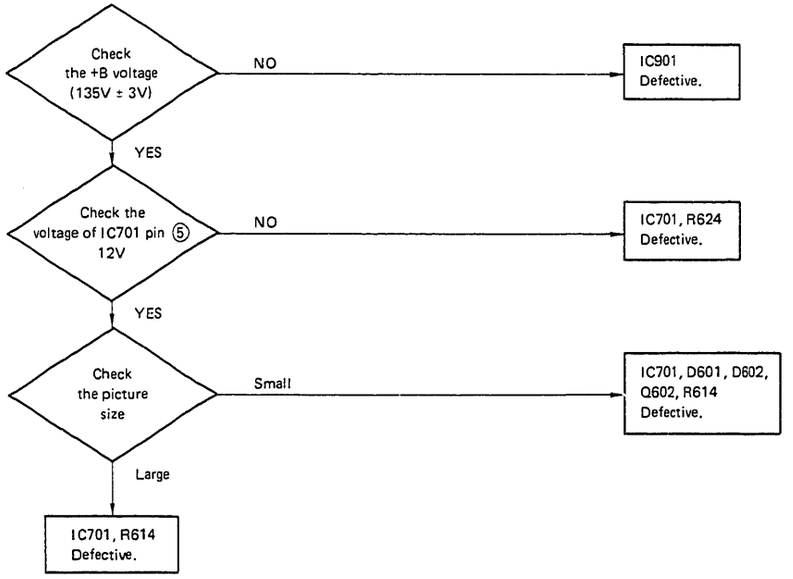
3. NO SYNC.



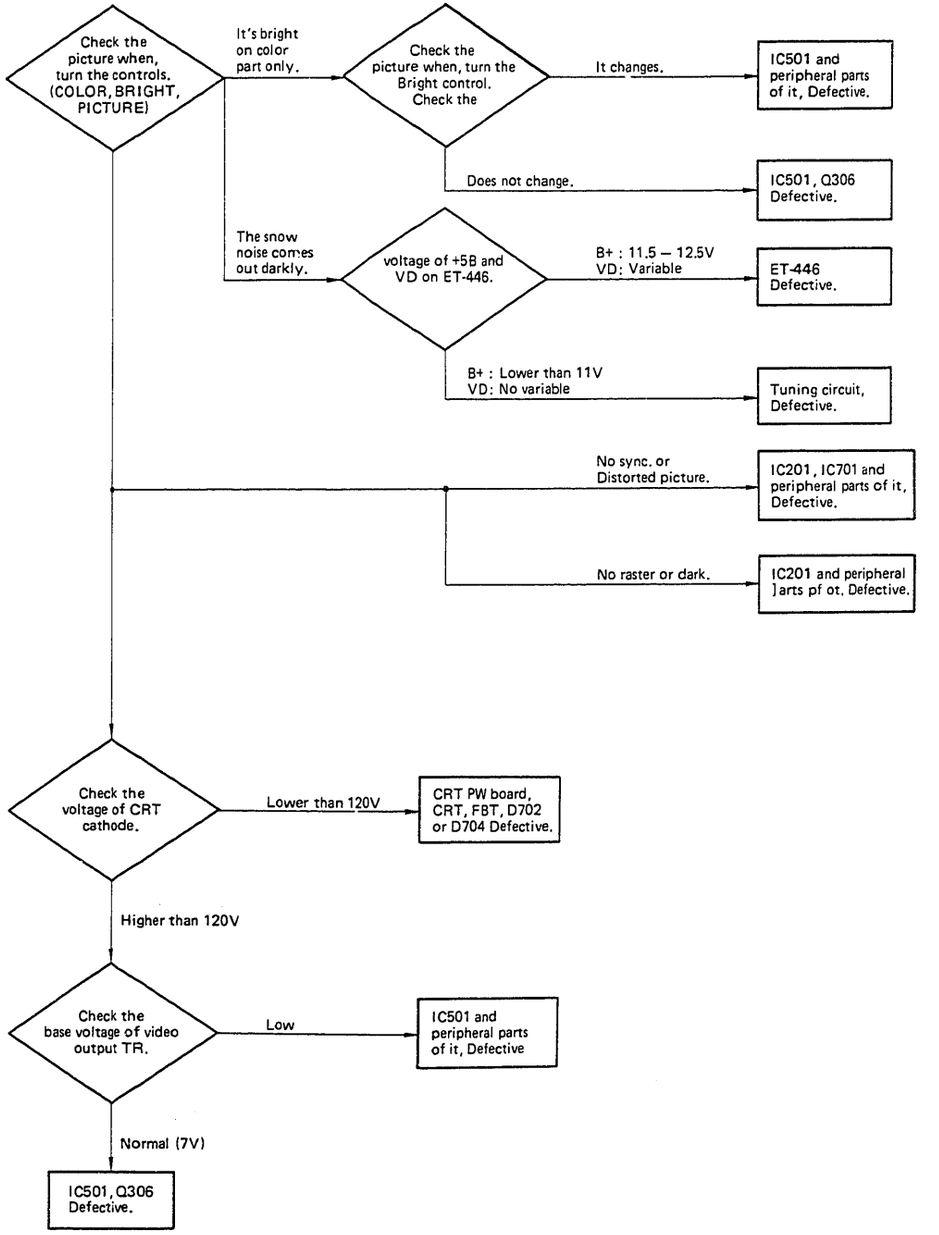
4. NO VERTICAL DEFLECTION



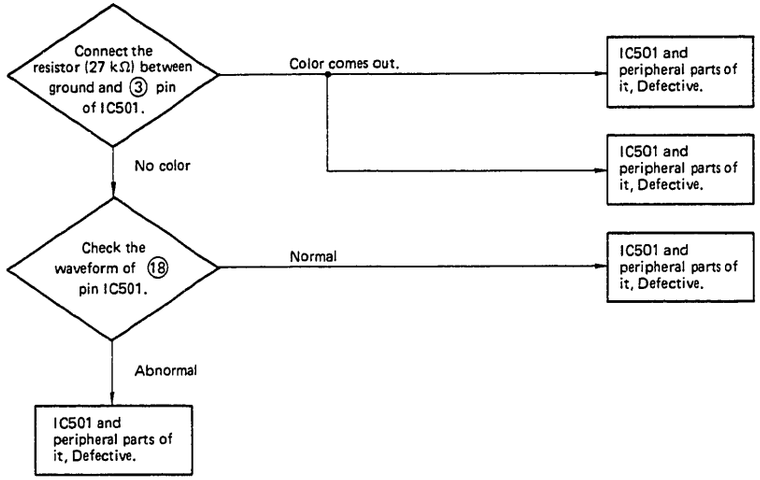
5. VERTICAL DEFLECTION SIZE DEFECTIVE



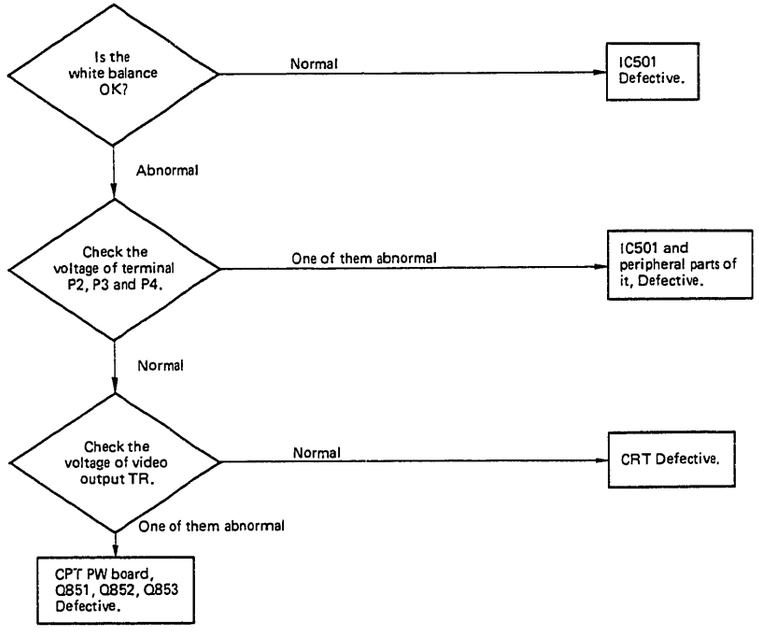
6. DARK PICTURE



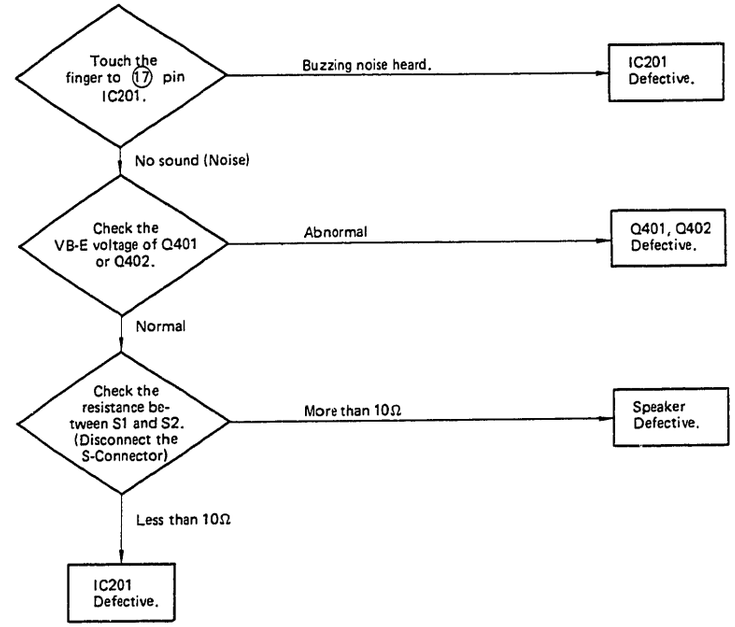
7. NO COLOR



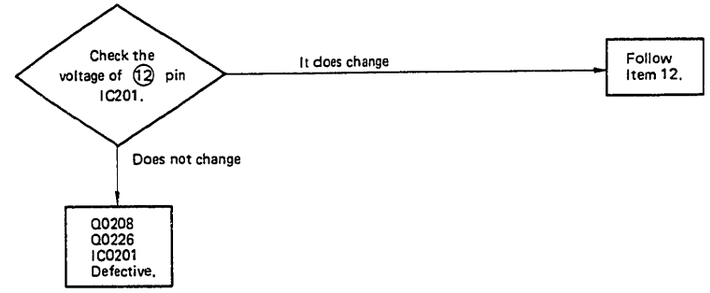
8. WHITE BALANCE/TINT DEFECTIVE



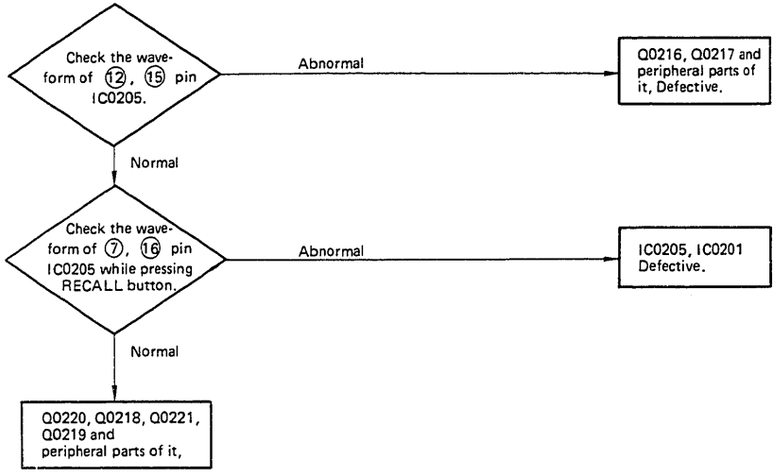
9. NO SOUND (For 10 Key)



10. NO SOUND OR NOT VARIABLE (For 10 Key)

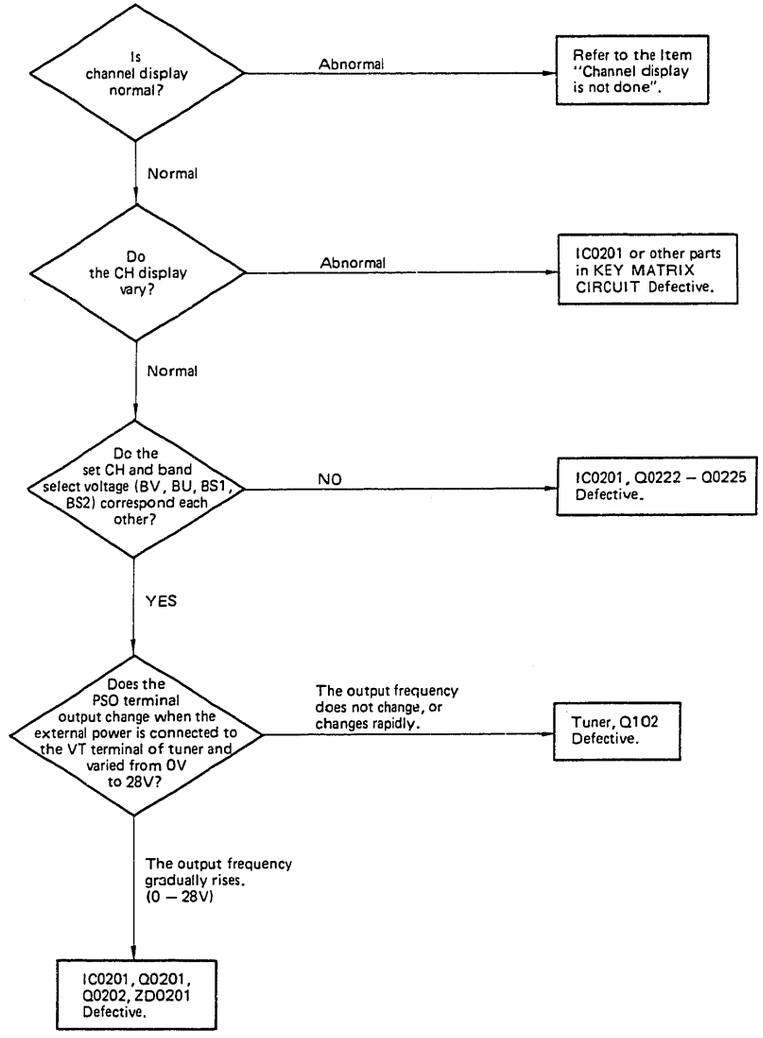


11. CHANNEL DISPLAY IS NOT DONE (For 10 Key)

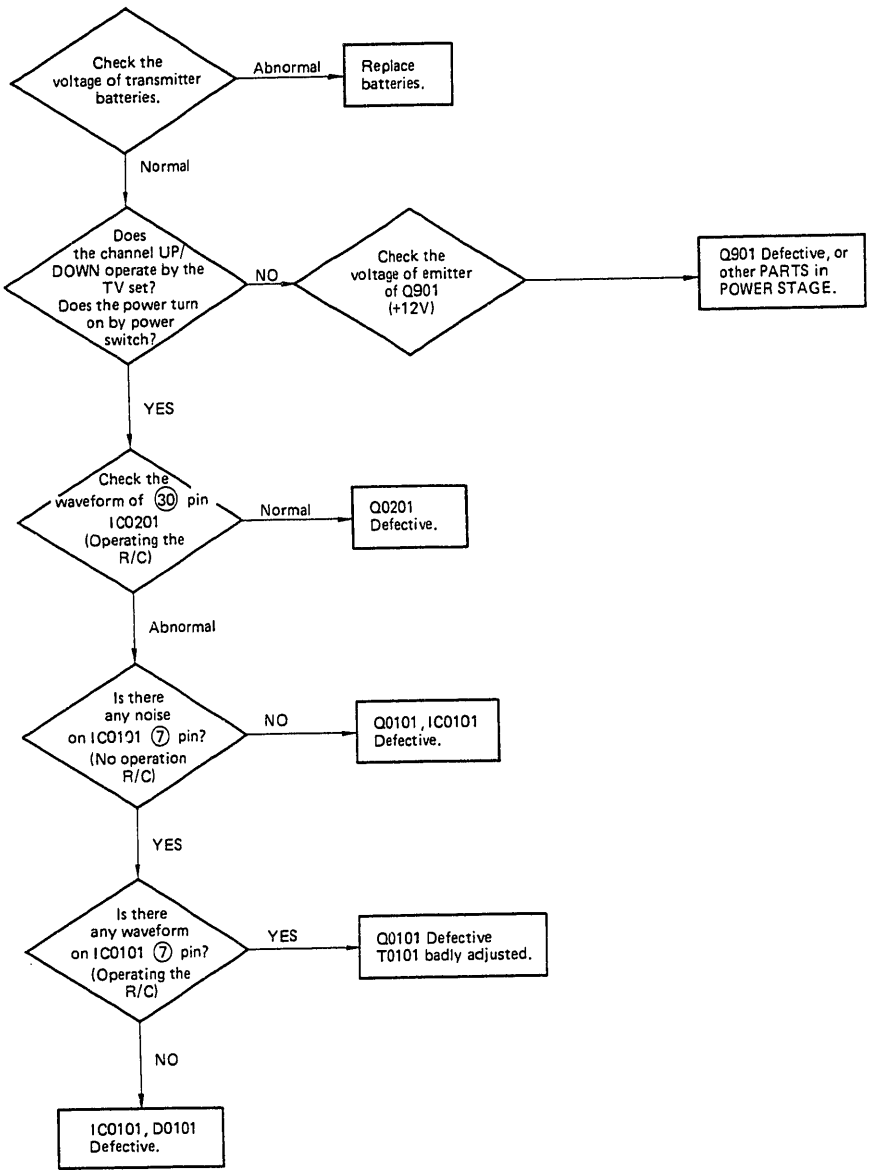


NP83X(A)

12. CHANNEL SELECTION IS NOT DONE

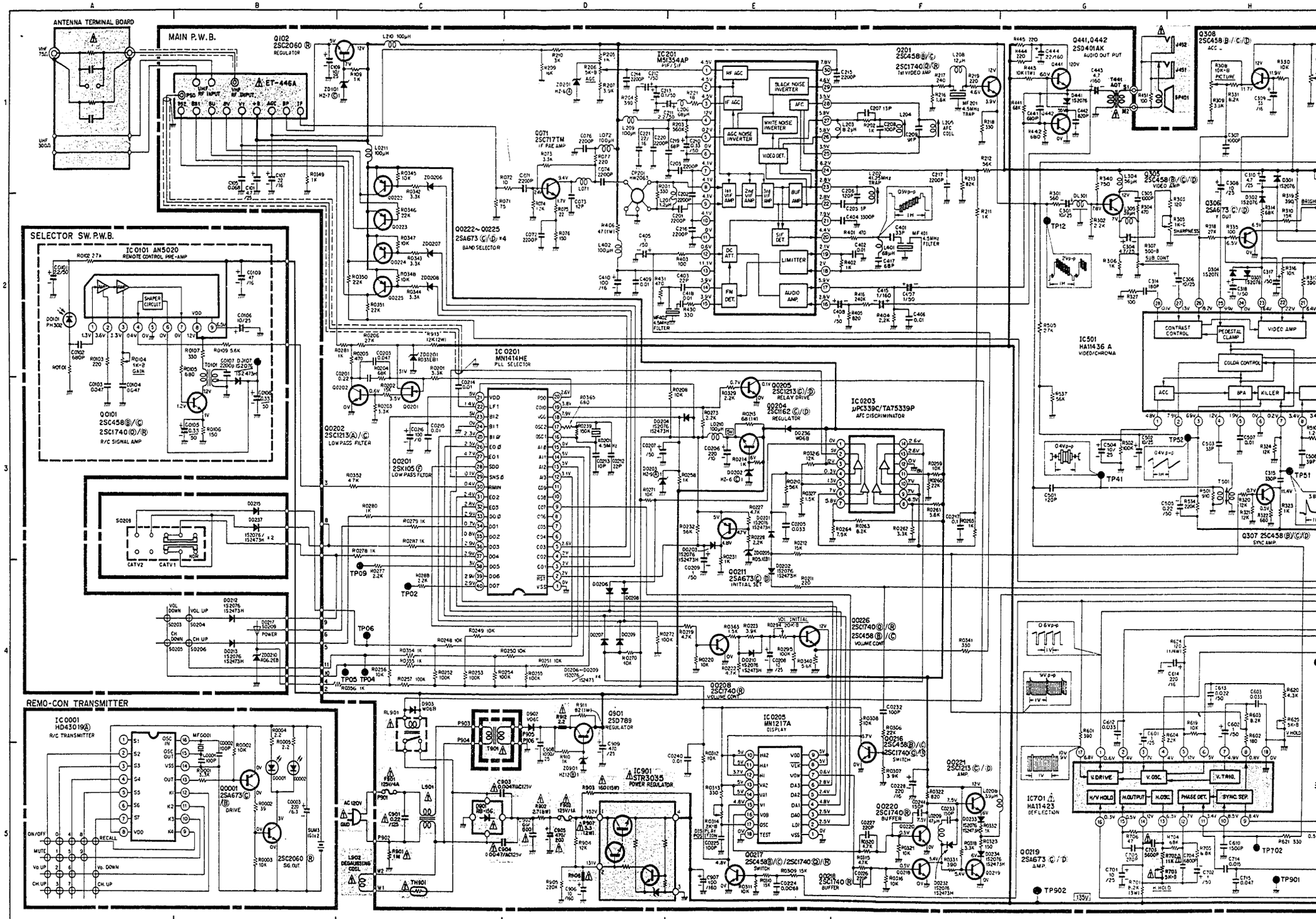


13. DOES NOT OPERATE BY REMOTE CONTROL (For CT1937, 19Z7, A37)



BASIC CIRCUIT DIAGRAM

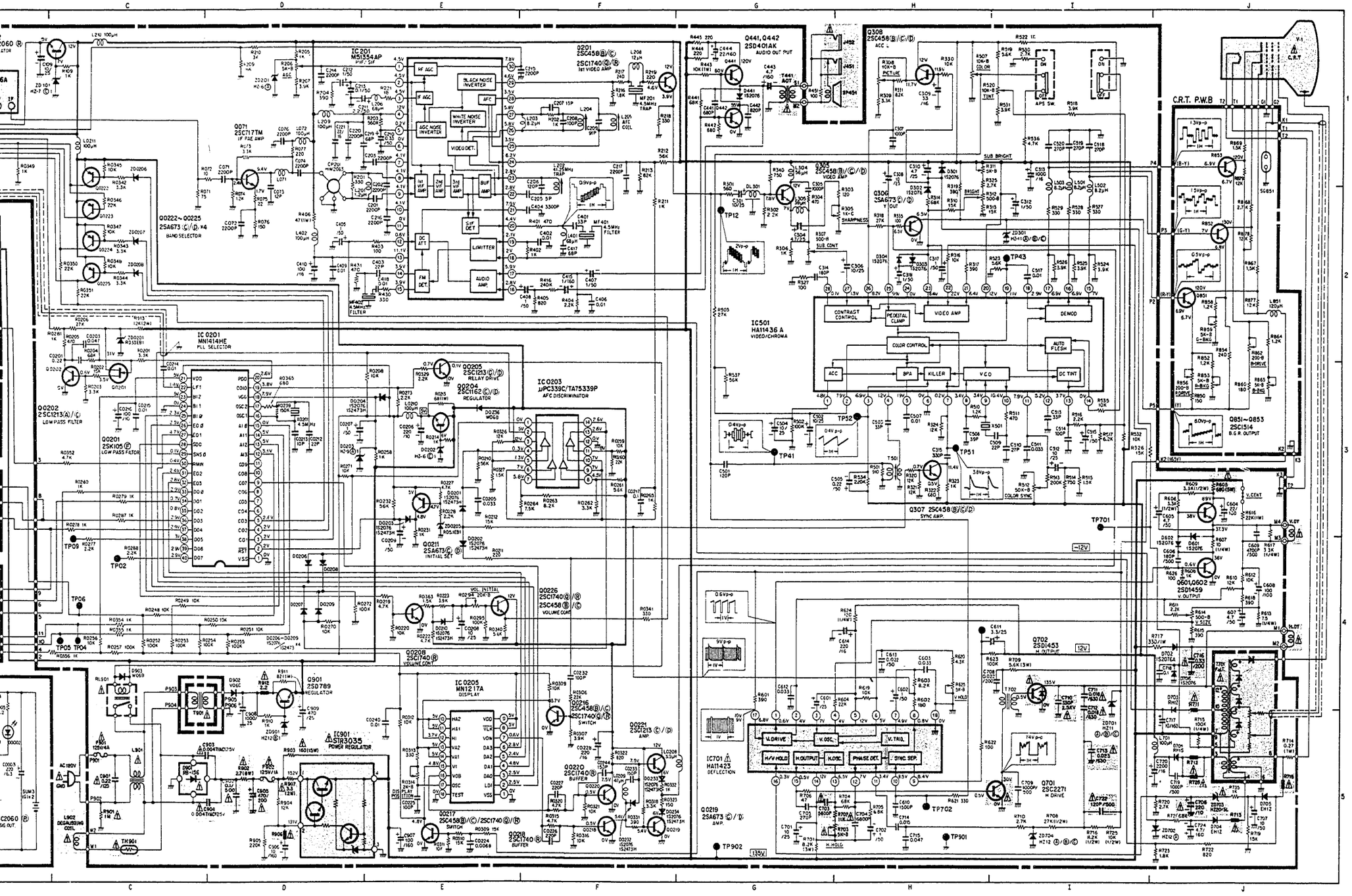
PRODUCT SAFETY NOTE: Co
safety. Before replacing any of t
Manual. Don't degrade the safety o



- Since this is a basic circuit diagram, the value of the parts is subject to be altered fro impro
- All DC voltage to be measured with a tester (100kΩ/V).
  Voltage taken on a complex color bar signal including a standard color bar signal.

BASIC CIRCUIT DIAGRAM

PRODUCT SAFETY NOTE: Components marked with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.



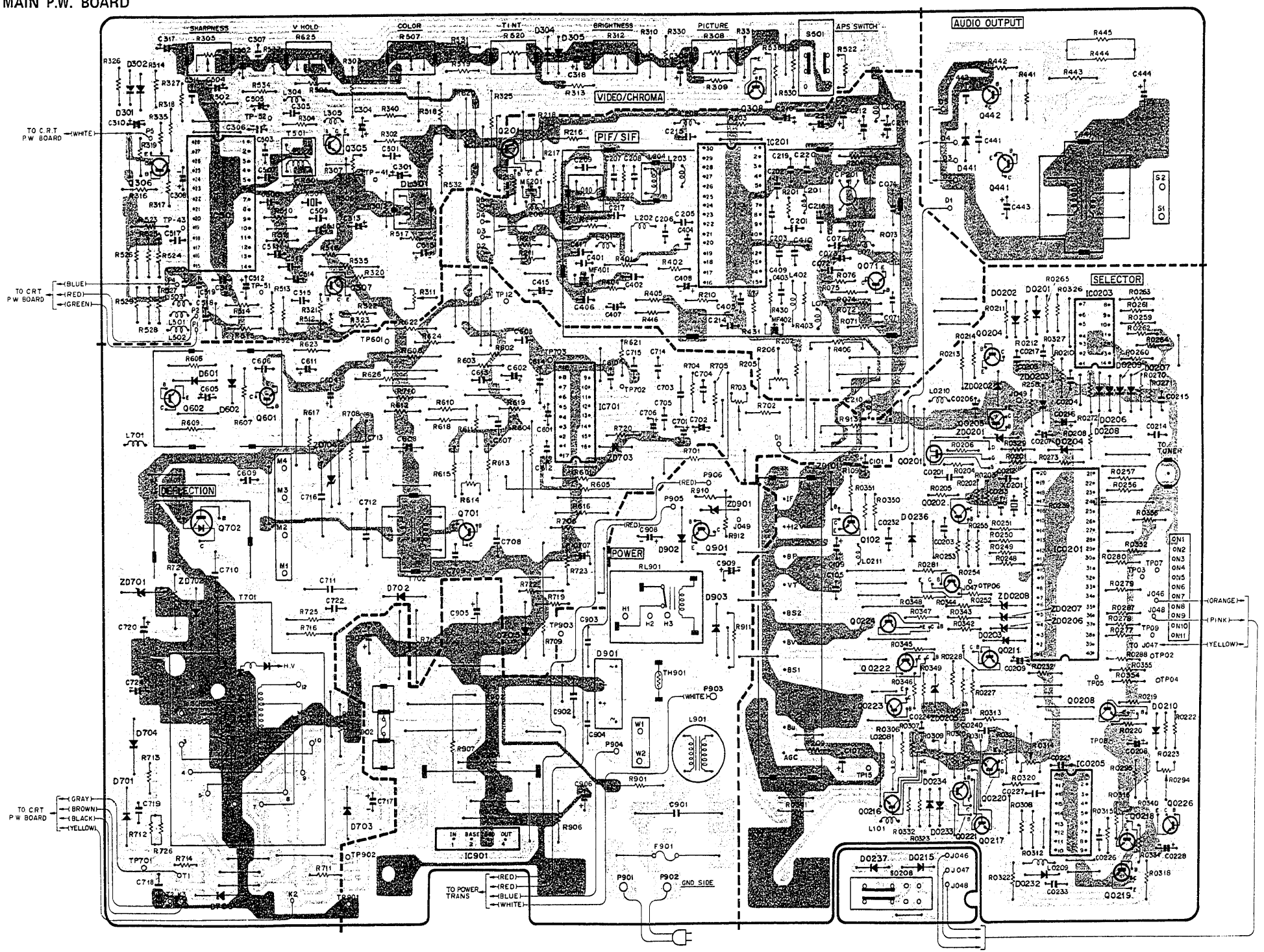
- Since this is a basic circuit diagram, the value of the parts is subject to be altered fro improvement.
- All DC voltage to be measured with a tester (100kΩ/V).
  Voltage taken on a complex color bar signal including a standard color bar signal.

PRINTED WIRING BOARD

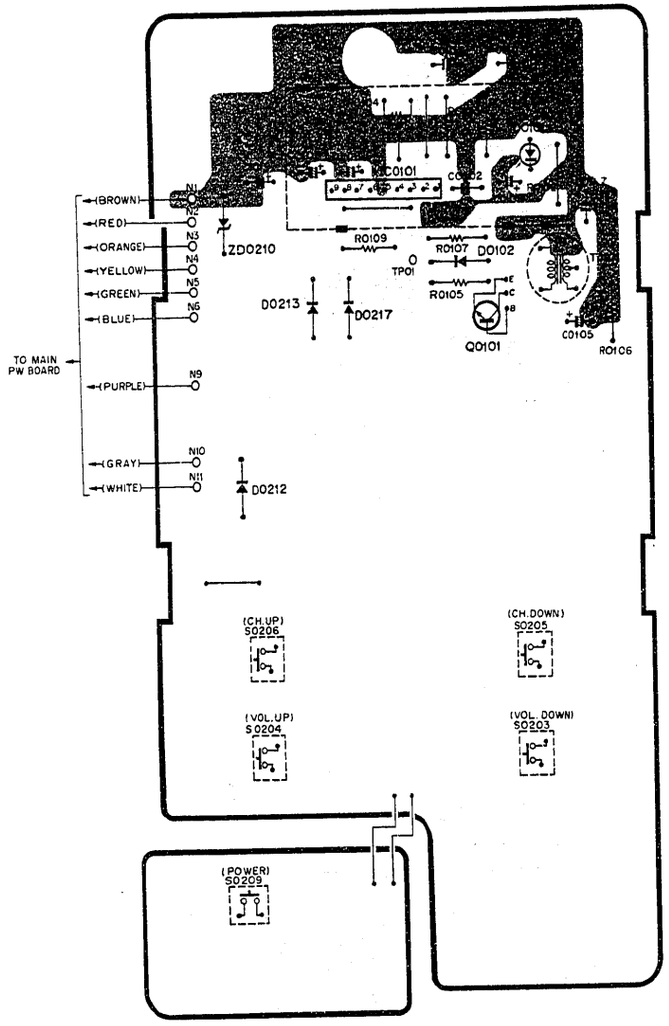
..... SIGNAL PATTERN

..... GROUND PATTERN

MAIN P.W. BOARD



SELECTOR P.W. BOARD



HITACHI PARTS ORDERING INFORMATION

To receive original replacement parts, please contact your nearest HITACHI Parts Distributor or contact Hitachi Central Parts Warehouse listed below. Be sure to indicate part catalog number, part description and model number (located on back of product).

THE ELECTRONIC DISTRIBUTION CO.
1509 E. Del. Amo Blvd. Carson, CA. 90746
Phone #213-639-4120

TEL-VIDEO CORPORATION
1921 N. Milwaukee Avenue Chicago, ILL. 60647
Phone #312-235-6190

REMCOR ELECTRONICS
10670 W. 9 Mile Road Oak Park, MI. 48237
Phone #313-541-5666

VANCE BALDWIN, INC.
7700 N.W. 7th Avenue Miami, FLA. 33150
Phone #305-693-2921

PANSON ELECTRONICS
32-70 31st ST. Long Island City, N.Y. 11106
Phone #212-545-8888

TEE-VEE SUPPLY CO.
3211 Washington St. Jamaica Plain, MA. 02130
Phone #617-522-9330

MARTIN WHOLESALE, INC.
6 Terrace Shopping Center Richardson, Tx. 75081
Phone #214-231-1826

HARCO ELECTRONICS, INC.
Carsin Run Aberdeen, MD. 21001
Phone #301-838-7990

HITACHI SERVICE MANUALS

To order HITACHI Service Manuals contact:

HITACHI SALES CORPORATION OF AMERICA
Central Parts Warehouse 401 W. Artesia Blvd.
Compton, CA 90220
Phone #213-537-8383

For imformation concerning repairs, operation or technical assistance, please contact the Service Manager of the nearest Hitachi Regional Office, Service Division listed:

Southern Regional Office
510 Plaza Dr. College Park, GA 30349
Phone #404-763-0360

Mid-Western Regional Office
1400 Morse Avenue Elk Grove Village, IL 60007
Phone #312-593-1550

Eastern Regional Office
1200 Wall Street West Lyndhurst, NJ 07071
Phone #201-935-8980

Western Regional Office
401 W. Artesia Blvd. Compton, CA 90220
Phone #213-537-8383

HITACHI SALES CORPORATION OF AMERICA

NATIONAL HEADQUARTERS OFFICE:	401 West Artesia Blvd., Compton Calif. 90220	Tel. 213-537-8383
Western Regional Office:	401 West Artesia Blvd., Compton Calif. 90220	Tel. 213-537-8383
Eastern Regional Office:	1200 Wall St. West, Lyndhurst, N.J 07071	Tel. 201-935-8980
Mild-Western Regional Office:	1400 Morse Ave., Elk Grove Village Chicago, Ill. 60007	Tel. 312-593-1550
Southern Regional Office:	510 Plaza DR., College Park, Georgia 30349	Tel. 404-763-0360

HITACHI SALES CORPORATION OF HAWAII, INC.

3219 Koapaka Street Honolulu, Hawaii 96819 Tel. 836-3621

HITACHI SALES CORPORATION DE PANAMA, S.A.

Apartado 7656, Panama 5, Calle Ramon Arias Y Calle B, Edificio Brasil 100,
Nuevo Reparto el Carmen, Republic de Panama Tel. 61-3100

HITACHI (HSC) CANADA INC.

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